Approaches to ensure and improve quality at Primary Healthcare Centres

A study of the effects of a structured patient-sorting system and a healthcare reform

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If you do not change direction, you may end up where you are heading.

- Laozi

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ABSTRACT

Background: Primary healthcare in Sweden meets increased demands from an aging population concerning quality and accessibility while dealing with a growing shortage of general practitioners and imperfect efficiency. Initiatives in the delivery and governance of primary care services attempt to improve quality and performance, but frequently do not attain the targeted results.

Aim: The thesis studies the effects of i) an initiative for improved health service delivery – the structured patient-sorting system (PSS) – and ii) a healthcare reform aiming to strengthen the patient's role and to improve access and responsiveness through freedom of choice and establishment.

Methods: A Swedish primary healthcare centre (PHCC) developed and implemented the PSS using improvement science methods. Changes in access rates and questionnaires on patients' and staff members' perceptions were analyzed quantitatively (Paper I). In a qualitative study (phenomenography) 11 staff members' conceptions of the PSS were analyzed (Paper II). In another qualitative study (content analysis) the perceptions of 24 managers of publicly owned PHCCs about the changes through the healthcare reform in Region Västra Götaland were analyzed (Paper III). In an observational study the differences between privately and publicly owned PHCCs in Region Västra Götaland were quantitatively analyzed concerning the listed populations, the patient perceived quality, the prescription rates of antibiotics and benzodiazepines, and the rate of follow-up for certain chronic conditions (Paper IV).

Results: The introduction of the PSS resulted in a 13% increase in the access rate on average, mainly through improved accessibility to physiotherapists and psychologists. More than 90% of the surveyed patients (n=96) were satisfied with both accessibility and treatment. 92% of staff members (n=36) were satisfied with the working situation (Paper I). Staff members conceptualized the PSS as an appropriate platform for the transformation into an effective patient-centred team. Improvement of health service delivery, professional development and team development took place concurrently (Paper II). Managers perceived the healthcare reform as a rapid change, enforced through financial incentives and leading to prioritization conflicts between patient groups with different care needs (Paper III). In comparison with publicly owned PHCCs (n=114), privately owned PHCCs (n=86) were characterized by: urban overrepresentation (54%); smaller population sizes (avg. 5932 vs. 9432 individuals); overrepresentation of individuals of working age (62% vs. 56%) and belonging to the second most affluent socioeconomic quintile (26% vs. 14%); better results in perceived patient

quality (82.4 vs. 79.6 points); higher 3-month prescription rates of antibiotics per 100 individuals (6.0 vs. 5.1 prescriptions) with a larger variance (SD 2.78 vs. 1.50); lower prescription rates of benzodiazepines; lower rates for follow-ups of chronic disease. While antibiotic use decreased, the use of benzodiazepines increased on average for all PHCCs over time (Paper IV).

Conclusions: The findings indicate a more efficient use of all competences at the PHCC and the transformation into an effective team through the PSS. Prioritization conflicts between patient groups emerged after the healthcare reform and the question of the effect of the ownership type on quality could not be answered unambiguously. Further research is necessary to improve health service delivery and health system governance.

Keywords: Primary healthcare, quality improvement, health services research, healthcare reform, Sweden

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SAMMANFATTNING PÅ SVENSKA

Bakgrund: Svensk primärvård står inför ett växande krav på kvalitet och tillgänglighet från en åldrande befolkning, medan bristen på allmänläkare ökar och brister i vårdprocesser kvarstår. Initiativ på olika nivåer försöker åstadkomma en förbättring av kvalitet och kapacitet, men lyckas inte alltid uppnå de avsedda resultaten.

Syfte: Denna avhandling studerar effekterna av i) ett initiativ för förbättring av hälso- och sjukvårdens processer - införandet av ett strukturerat patientsorteringssystem vid en vårdcentral - och ii) vårdvalsreformen som syftar till att stärka patientens roll och förbättra kvaliteten i termer av tillgänglighet och bemötande genom åstadkommandet av valfrihet till vårdgivare och genom fria etableringar.

Metod: Ett strukturerat patientsorteringssystem utvecklades genom förbättringskunskapsbaserade metoder vid en vårdcentral. Förändringar i tillgänglighet samt patienters och personalens uppfattningar undersöktes i första delarbetet. I andra delarbetet undersöktes i en kvalitativ intervjustudie med en fenomenografisk ansats, personalens uppfattningar av det nya systemet. I tredje delarbetet undersöktes i en kvalitativ intervjustudie (innehållsanalys) uppfattningar av 24 chefer från offentliga vårdcentraler om effekterna av vårdvalsreformen i Västra Götalandsregionen. I fjärde delarbetet undersöktes kvantitativt skillnaderna mellan privat och offentligt ägda vårdcentraler i Västra Götalandsregionen avseende egenskaper av den listade befolkningen, den patientupplevda kvaliteten, förskrivningen av antibiotika och beroendeframkallande lugnande mediciner och uppföljningen av vissa kroniska sjukdomar.

Resultat: Efter införandet av ett strukturerat patientsorteringssystem ökade tillgängligheten till vårdcentralens personal i genomsnitt med 13 %. Den absoluta majoriteten av patienterna och medarbetarna var nöjd med vårdcentralens tillgänglighet och arbetssituationen (delarbete I). Medarbetarna uppfattade det nya systemet som en lämplig plattform för omvandlingen till ett effektivt patientcentrerat team. Förbättring av sjukvårdsprocesser, kompetensutvecklingen och grupputvecklingen hade ägt rum samtidigt (delarbete II). Vårdvalsreformen uppfattades av vårdcentralchefer som att främst verka genom ekonomiska incitament. Förändringarna upplevdes ske snabbt och ledde till prioriteringskonflikter mellan patientgrupper med olika behov och krav (delarbete III). Jämfört med offentligt ägda vårdcentraler, kännetecknades privat ägda vårdcentraler av: en högre andel fanns i storstaden; de hade befolkningsgrupper, som

kännetecknades av en högre andel av personer i arbetsför ålder och tillhörande den mer välbärgade samhällsekonomiska gruppen; bättre resultat i patientupplevd kvalitet; relativt sett fler antibiotika förskrivningar och mindre förskrivningar av beroendeframkallande lugnande mediciner; en lägre andel av genomförda kontroller för patienter med vissa kroniska sjukdomar. Medan antibiotikaförskrivningen minskade över tid, ökade förskrivningen av beroendeframkallande lugnande mediciner båda bland de privat och offentlig ägda vårdcentralerna (delarbete IV).

Slutsatser: Resultaten tyder på att införandet av ett patientsorteringssystem gav en effektivare användning av personalen på vårdcentralen och uppfattades av medarbetarna som en lämplig plattform för omvandlingen till ett effektivt patientcentrerat team. Prioriteringskonflikter mellan patientgrupper med olika behov och krav har uppstått efter vårdvalsreformen. Frågan om huruvida kvaliteten på vårdcentralen påverkades beroende av ägandeformen kunde inte besvaras entydigt. Ytterligare forskning behövs för att förbättra sjukvårdens processer och modeller för styrning av hälso- och sjukvård.

LIST OF PAPERS

This thesis is based on the following studies, referred to in the text by their Roman numerals.

I. Thorn J, Maun A, Bornhöft L, Kornbakk M, Wedham S, Zaffar M, Thanner C. Increased access rate to a primary health-care centre by introducing a structured patient sorting system developed to make the most efficient use of the personnel: a pilot study. Health Services Management Research. 2010;23(4):166–71.

II. Maun A, Engström M, Frantz A, Björk Brämberg E, Thorn J. Effective teamwork in primary healthcare through a structured patient-sorting system - a qualitative study on staff members' conceptions. BMC Family Practice. 2014;15(1):189.

III. Maun A, Nilsson K, Furåker C, Thorn J. Primary healthcare in transition – a qualitative study of how managers perceived a system change. BMC health services research. 2013;13(1):382.

IV. Maun A, Wessman C, Sundvall P, Thorn J, Björkelund C. Is the quality of primary healthcare services influenced by the healthcare centre's type of ownership? – An observational study of patient perceived quality, prescription rates and follow-up routines in privately and publicly owned primary care centres. Submitted.

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CONTENTS

ABBREVIATIONS

ATC	Anatomical Therapeutic Chemical Classification
CNI	Care Need Index
COPD	Chronic Obstructive Pulmonary Disease
DDD	Defined Daily Doses
DM	Diabetes Mellitus
GP	General Practitioner
HbA1c	Glycated haemoglobin
HPT	Hypertension
IHD	Ischemic Heart Disease
LDL	Low-density lipoprotein
NDR	National Diabetes Register
NPS	National patient survey
OECD	Organisation of Economic Cooperation and Development
PCC	Primary Care Centre (= PHCC Primary Healthcare Centre)
PHCC	Primary Healthcare Centre (= PCC Primary Care Centre)
PPQ	Patient Perceived Quality
PSS	Structured patient-sorting system
QI	Quality Improvement
QregPV	Regional Quality Registry for chronic diseases
SALAR	Swedish Association of Local Authorities and Regions

SD	Standard deviation
SQUIRE	Standards for Quality Improvement Reporting Excellence
Strama	Swedish Strategic Programme Against Antibiotic Resistance
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology
UN	United Nations
VGR	Region Västra Götaland
WHO	World Health Organization

DEFINITIONS IN SHORT

Accessibility (to care)	The ability to get medical care and services when needed.
Complex system	Something with many parts where those parts interact with each other in multiple ways. Relationships between parts give rise to the collective behaviours of a system and how the system interacts and forms relationships with its environment.
Comprehensiveness	The state of covering something completely or broadly; including many, most, or all things.
Continuity (of care)	Non-disruption of care provided to a patient throughout his/her care journey.
Effectiveness	The ability of someone or something to produce the intended result.
Efficiency	The production of desired results with the minimum waste of time and effort.
Empowerment	The gaining by individuals or groups of the capability to fully participate in decision-making processes in an equitable and fair fashion.
Governance	The process of governing a country or organization through laws, norms, power or language.
Health inequality and inequity	Health inequalities are the differences in health status or in the distribution of health determinants between different population groups. Avoidable, unjust or unfair distributions of health determinants lead to inequity in health.

Health Service delivery	The content and ways of services provided by medical professionals in healthcare
Public policy	A declared state agreement or consensus relating to the health, morals, and well-being of the citizenry, which need to be addressed.
Qualitative study	Qualitative research uses interviews and does not try to quantify anything or use statistical methods. Rather, it seeks to understand other people's perspectives and motivations. Consequently, qualitative researchers often use small sample sizes as they are not seeking to statistically generalise their findings.
Quantitative study	Quantitative research is the systematic empirical investigation of observable phenomena via statistical, mathematical or numerical data or computational techniques. The objective of quantitative research is to develop and employ mathematical models, theories and/or hypotheses pertaining to phenomena.
Quality	The quality of a product (article or service) is its ability to satisfy the needs and expectations of the customers/clients (Bergman and Klefsjö).
Quality Improvement (in healthcare)	The combined efforts of healthcare professionals, patients and their families, researchers, payers, planners and educators to make the changes that will lead to better patient outcomes, better system performance and better professional development.
Stewardship	An ethic that embodies the responsible planning and management of resources.

Sustainability	A type of development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Universal Coverage	The provision of health care for the entire group - including preventive care - i.e., vaccines, screening, outpatient visits to a generalist or specialist, hospitalization for basic and catastrophic needs.

1 INTRODUCTION

This chapter explains the right to health and the role and the content of primary healthcare. It gives an outline of the organization of primary healthcare in Sweden and its historical origins. It describes the challenges and necessary reforms for primary healthcare that motivated the studies in Papers I-IV. Furthermore, the origins and methods of improvement science and the difficulties of its application in healthcare are illustrated. The importance and complexity of appropriate governance in healthcare is clarified. Finally the context for the studies conducted is described.

1.1 Primary care as a core content of the right to health

The right to health

The World Health Organization (WHO) has stated that the right to health includes access to timely, acceptable, and affordable healthcare of appropriate quality [1]. The UN Committee on Economic, Social and Cultural Rights clarified this in 2000 by defining four elements: availability (sufficient quantity of functioning healthcare facilities), accessibility (health facilities, goods and services accessible to everyone), acceptability (respectful of medical ethics and culturally appropriate) and quality (scientifically and medically appropriate and of good quality) [2][3].
According to the General Comment this imposes also a "core content" which includes, beside safe water, nutritious food, sanitation and essential drugs the access to essential primary care [2].

The role of primary care in healthcare

The ultimate goal of primary care is better health for all, according to the WHO, stated in the Declaration of Alma-Ata and its subsequent clarifications [4][5][6][7]. The function of primary care in healthcare is crucial: it acts as the first contact for patients, providing continuity and a wide care supply including the coordination of other specialist care if needed [8]. It provides a broad range of medical services for all ages such as initial medical assessments, treatment of injuries and illnesses that do not require hospitalization, preventive measures and rehabilitation. Furthermore it substantially also includes family- and community aspects that significantly influence the holistic situation of the patient [9][10][11][12][13]. In contrast to most approaches in specialist care, primary care does not predominantly

focus on diseases, but has primarily a patient-centred as well as a person-focused approach [14][15].

Due to its central role, the decisions made in primary care are of great importance for the quality and effectiveness of the entire health sector [6][16][17][18]. Prior research has shown that an increased availability of primary care may lead to lower mortality and morbidity and increased life expectancy and, if equipped with adequate resources and investment, primary care can provide much better value for money than its alternatives [6][19]. The evidence shows that primary care (in contrast to specialist care) is associated with a more equitable distribution of health in populations, both in cross-national and intra-national studies [20][21]. Personal continuity, which is typical for primary care, is likely to increase patient satisfaction and health outcomes, and concurrently leads to lower healthcare costs [19][22][23][24].

The above-mentioned aspects of primary care imply that two complementary aspects characterize the overall quality of primary care: relationship quality and biomedical quality. Thus certain key features of primary care ensure the realization of these two aspects: accessibility combined with continuity, practice characterized by a professional attitude and effective treatment in accordance with current standards of medical knowledge (Figure 1).

Figure 1. Aspects of quality in primary care. By Andy Maun (own work) 2009.

1.2 Comprehensiveness of primary care

Due to its broad assignment and its unique function in the health system, the composition of patient groups in primary care differs significantly compared with specialist care. While specialist care mainly treats patients with similar diseases, primary care treats the same group of patients under longer periods coping with different conditions and diseases [9]. Additionally primary care populations in different geographical locations vary significantly due to dissimilar socioeconomic situations that have a great impact on the population's health situations [25][26]. Figures 2-4 illustrate the different patient groups and their characteristics typical for high-income countries, in this case based on a Swedish perspective. Citizens use the different levels of healthcare systems to a varying extent during their lifetimes as illustrated in Figure 2:

- Most new-borns today have a short contact episode with specialized care (obstetrics) followed by a period of regular child healthcare checks and episodes of care for minor infections. Only a small proportion of children are in need of specialized care [27].
- Adolescents and young adults have a relatively limited need of healthcare compared to older citizens and solve minor problems mostly through self-care [27][26]. However it should be mentioned that those with special healthcare needs and their families represent an important underserved population [28].
- With increasing age, the risk of symptoms, emerging diseases and multi-morbidity increase, leading to a growing need for primary and specialized care contacts [26].
- Among the frail elderly multi-morbidity is common and the need for geriatric care also creates a demand for municipal care [29].

The varying needs during different lifetime episodes create four groups of patients with unequal needs and degrees of empowerment. This requires adapted organizational structures and routines for the optimal delivery of care for these inhomogeneous groups. The Figures 3 and 4 illustrate the four groups and their characteristics:

- The first group of mainly small children who receive regular health checks can be organized in planned visits and standardized routines. However the same group frequently seeks for minor infections, which require quick access for assessment and treatment. Few of these patients require referrals to specialized care [27]. These patients are usually well empowered through their advocating parents.

- The second group of patients is typically well-empowered and previously in good health, seeking medical care due to recent symptoms or emerging, often transient diseases [17]. The contact episodes vary from single visits to multiple visits within months and are characterized by diagnostic and therapeutic measures, sometimes requiring contacts with specialized care. This patient group typically prefers easy access for quick assessment due to their own uncertainty of the severity of their condition.
- The third group of patients has chronic conditions and is in need of frequent contacts with personal continuity. This group requires planned visits with longer consultations as their diseases influence their life situations and vice-versa. Additionally, quick access is needed when complications emerge. Some of these patients are stable for years and can be handled in primary care, while others also require the efforts of specialist care that need to be coordinated. Moreover, new symptoms and diseases might emerge leading to a growing resource demanding complexity and increasing risk for complications and adverse events. With rising complexity patients usually become less empowered.
- The fourth group is the least empowered patient group, characterized by multi-morbidity and pre-existing complexity, making them highly vulnerable for complications [30][31][32]. Guidelines for treatment often need to be adapted due to mutually restricting therapy regimes and co-morbidities. Polypharmacy and fragmentation of care are usual on account of the involvement of many medical operators [33][34]. Personal continuity is highly beneficial for the patient regarding relationship quality, biomedical quality and the effective use of resources. This becomes in particularly evident when patients lose the ability to speak for themselves and knowledge about previous personal preferences helps with appropriate decision-making [30].

Figure 4 illustrates that medical problems typically accumulate over time and are mutually reinforcing, thus leading to an increase in complexity and care need. The contact episodes with primary care are in Figure 4 symbolized by rhombs for transient and triangles for chronic conditions. The width of the symbols corresponds to the severity of the condition and the height corresponds to the duration. The red colour represents conditions typical for group 1 (infections), the blue colour represents conditions typical for group 2 (other transient symptoms and diseases) and the purple colour represents chronic conditions. Red and blue symbols occur also in the groups 3 and 4 additionally to the widening purple symbols, which illustrates the accumulation of medical problems and the increasing complexity that needs to be handled.

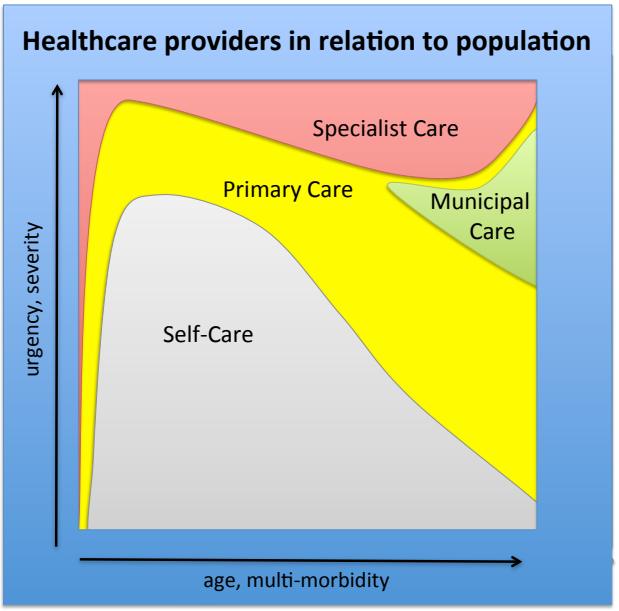
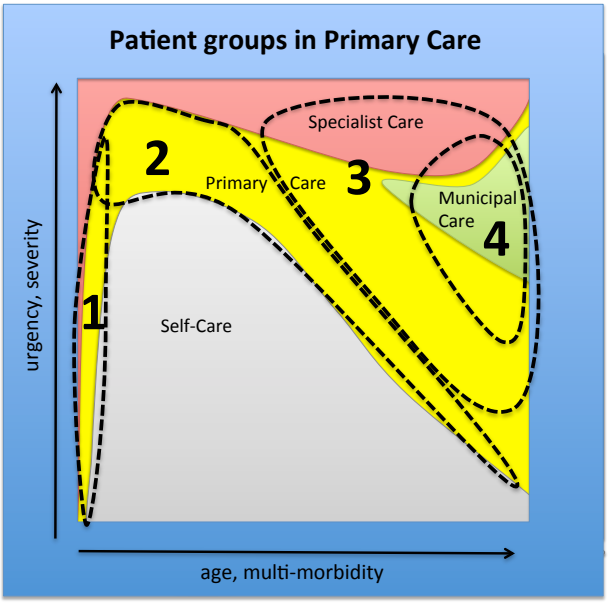


Figure 2. Healthcare providers in relation to population. By Andy Maun (own work) 2014.



1 Child Healthcare Centre, Minor Infections

2 Symptoms and Recently Emerging Diseases

3 Chronic Diseases

4 Frail Elderly

Figure 3. Patient groups in primary care. By Andy Maun (own work) 2014

Figure 4. Characteristics of care needs of different patients groups in primary care. By Andy Maun (own work) 2014

The definition of primary care in Sweden in the Health and Medical Services Act (1995) reflects this comprehensive approach: “Primary care as a part of out-patient care shall, with no restrictions as to illness, age or patient categories, cater to the need of the population for such basic treatment, nursing, preventive work and rehabilitation as do not require the medical and technical resources of a hospital or other special competence.”

1.3 The central role of the consultation

The medical consultation is at the very core of primary healthcare provision as it is crucial for decision-making in diagnostic and therapeutic processes. Since there are a number of factors that influence the quality of this important meeting, such as e.g. appropriate time or availability of information, this chapter provides a short overview of the key points of the medical consultation. In this personal conversation the patient and the medical professional need to understand each other’s knowledge, experiences, ideas, concerns and expectations [35]. Only the parts of the consultation where both participants actually understand each other can create sustainable value (Figure 5). The communication in medical consultations is still partly characterized by paternalism, but a primary care led movement of special communication trainings is aiming to understand patients’ core questions and empower them to be more active in solving their health issues [36][37][38][39]. This becomes relevant, as there is a global rise of non-communicable, chronic diseases that closely connected to the behaviour and habits of people (overweight, physical inactivity, tobacco use). Future trends in people’s habits will have an extensive influence on the global health status [40]. While public health reforms use a systemic approach, the individual medical consultation has its own potential to change a patient’s behaviour [41][42][43]. The potential of this method is probably underestimated and not fully in use yet, because medical professionals usually require considerable additional targeted training to be effective and mechanisms in behaviour change are only partially understood [37][44][45]. A number of factors that influence the quality of this important meeting: social determinants like deprivation might lead to the medicalization of problems; ineffective health processes can hinder access to necessary information; a lack of continuity or communication skills may reduce the professional’s possibility of understanding; distrust might reduce the patient’s participation and adherence (Figure 6). In the ideal situation the medical consultation is embedded in supportive structures: a health-promoting society, empowered individuals, professionals with intrinsic drive and effective healthcare systems (Figure 7).

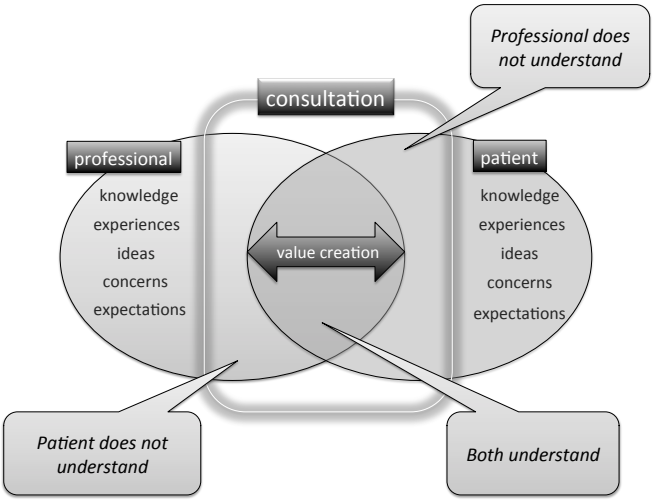


Figure 5. Understanding in the medical consultation. By Andy Maun and Bernd Sengpiel (Own Work), 2012.

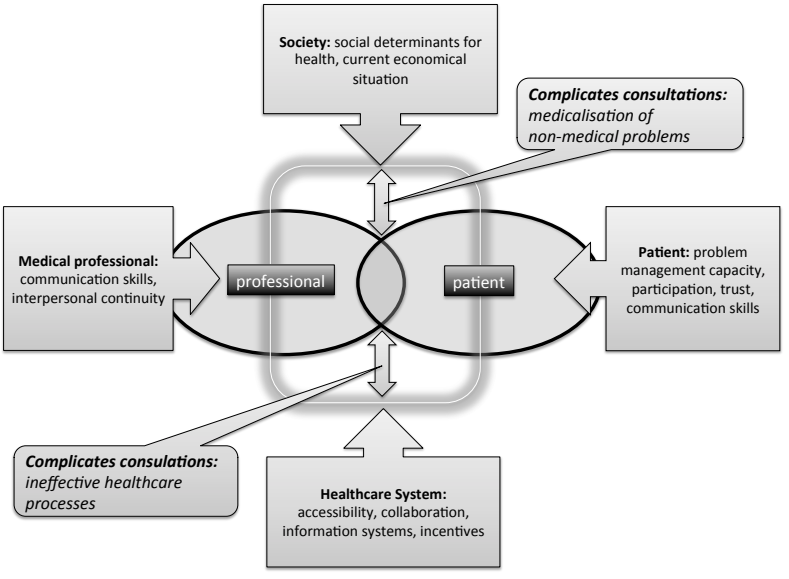


Figure 6. Factors that influence the medical consultation. By Andy Maun and Bernd Sengpiel (Own work). 2012

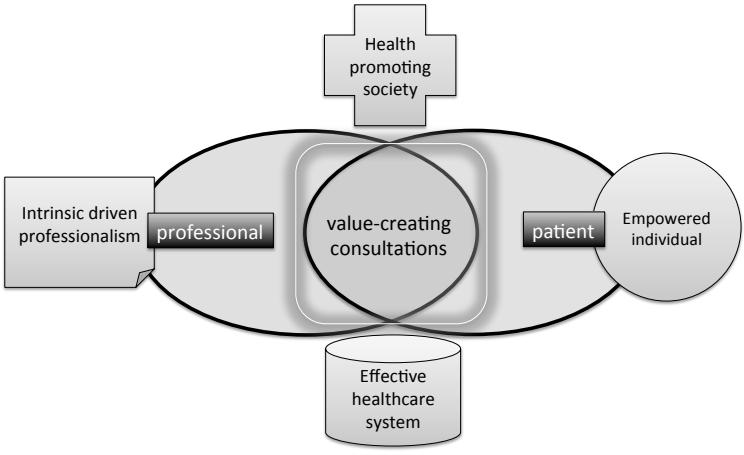


Figure 7. The ideal situation for the medical consultation. By Andy Maun and Bernd Sengpiel (own work) 2012.

1.4 Organization of primary care in Sweden

Healthcare economics and ethical principles

The total healthcare budget in Sweden is equivalent to 9.6% of the gross domestic product (2012) [46]. 81% of health spending was funded by public sources and primary care constitutes for around 20% of the total healthcare budget [47][48]. The distribution of resources is regulated according to ethical principles is stated the Health Care Act: Those who are most in need of healthcare should be given priority [49]. Prioritization in healthcare should be therefore be based on following three principles:

1. The principle of human dignity: care should be given on equal terms for the entire population regardless of personal characteristics and functions in society.

2. The principle of need and solidarity: those who have the greatest need of care should be given priority in healthcare.

3. The principle of cost-effectiveness: healthcare should be conducted cost-effectively, but cost considerations in the individual case should only be made in compliance with the two above-mentioned principles [49][50].

It has to be emphasized that the principles have different weight: the search for cost-effectiveness may not involve denial of medical care, or degrade the quality of care for those who are most in need of healthcare.

Historical perspective on primary care in Sweden

The roots of the organization of primary care in Sweden date back to the late 16th century where the function of district medical officers was established and successively expanded in order to mediate medical care and monitor the state of health and the sanitary conditions of the population [51][52]. With the rising influence of rapidly expanding hospital care and massive recruitment problems of district medical officers, the survival of primary care was threatened in the 1950s [52]. In 1963 the County Councils were made accountable for the district medical officers and in 1968 the first Swedish primary care centre with several General Practitioners was established in Dalby in the county of Skåne [52]. With the establishment of primary healthcare centres in the whole country in the 1970s, district nurses, physiotherapists and occupational therapists as well as child and maternity care were integrated into the primary care organizations [51]. Today these primary healthcare centres are the predominant organizational form of the comprehensive primary care sector and, although not having a formal gatekeeper function, patients usually enter the healthcare system via primary care [53]. Primary care counts for about half of all physician visits, (the other half is within specialized care), while General Practitioners account for only 17% of all physicians [54]. Through the continuous upgrade of educational requirements, the speciality of General Practice today demands 5 years of vocational training following a comprehensive curriculum [55]. The above-mentioned attributes make Swedish primary care into a model that many countries aspire to emulate [53]. However, despite powerful wage increases and the above- mentioned development of comprehensive primary care, there is still an enormous lack of General Practitioners and it is a common conception among citizens that hospital specialists provide better overall care and are somehow superior to General Practitioners [51][52].

Current organization and recent reforms

Primary care in Sweden is delivered by more than 1,100 publicly and privately owned primary care units throughout the country [56]. General practitioners are responsible for patient safety, appropriate quality of care and the patient's continuous contacts with primary care. The primary care centres´ managers are responsible for daily operations and for adequate conditions so that medical care for the patient meets the requirements for safe and proper care according to the Health Care Act and the Patient Safety Act [17].

The state controls the primary healthcare through legislation, guidance, supervision, monitoring, and by agreements between the state and County Councils, which are signed between the Ministry of Social Affairs and Swedish Association of Local Authorities and Regions (SALAR). The County Councils are responsible for ensuring that all residents in the county have access to primary care. They define the requirements to be met for primary healthcare centres in specifications and regulate compensation based on the same principles for all centres regardless of their type of ownership. The demands on healthcare providers and reimbursement systems architecture vary between counties [17].

Several reforms have been carried out since the late 1980s to strengthen the freedom of choice, continuity and availability of primary care: 1. the Federation of County Councils' recommendation of freedom of choice including primary care (1989); 2. the Family doctor reform (husläkarreformen) (1994); 3. the Agreement on Healthcare Guarantee in Primary Care (1996); 4. the National Plan for the Development of Health Care (2000); 5. The Agreement on Primary Healthcare Guarantee (vårdgaranti i primärvåren) (2005) [17].

The Agreement on Primary Healthcare Guarantee (vårdgarantin) means that any individual seeking care should be able to get in touch with primary care the same day (availability guarantee) and should be given an appointment with a doctor within 7 days from the time of initial contact, provided that the caregiver has determined that the person needs to visit a doctor (visiting warranty) [57].

In 2010, the Act on System of Choice in the Public Sector made it mandatory for County Councils to implement a customer choice system in primary care [56]. The reform on freedom of choice regarding primary care provider is based on the ideas in the Family Doctor Reform (husläkarreformen) that came into effect in 1994 but was torn up after the change of government in

the same year. It gave the patient the right to choose a doctor and also included the right of free establishment for doctors and physiotherapists. The aim was to strengthen continuity and availability by enhancing the patient's free choice of his/her primary care provider [17].

The recent reform means that the County Councils only define the assignment and reimbursement schemes and may not decide who is to provide care or where it will be carried out. It also means that the providers are competing for patients. The aim of this reform is, according to the government, to focus on the individual and to shift power away from politicians and officials to citizens, thus increasing citizens' choice and influence as well as increasing the number of providers and their diversity. The government argued that the reform would create conditions that encourage care providers to improve the quality and efficiency of care, as the compensation comes with the patients who will seek the best provider according to their preferences [17][58][59].

1.5 Challenges for primary healthcare in Sweden

As life expectancy increased globally by eight years between 1950 and 1978 and seven more years since then, aging has become the major challenge for health systems, particularly, but not exclusively, in industrialized countries [6]. Life expectancy in Sweden reached 81.8 years in 2012, 1 ½ years longer than the OECD average and the 8th longest worldwide [46]. Sweden has the second-lowest infant mortality rate and a good international ranking in indicators like obesity rate or smoking rate. The Euro Health Consumer Index which annually ranks European health systems by an index compiled from measurements of patient rights and information, accessibility, medical outcomes, prevention, range of services and pharmaceuticals ranks Sweden in its most recent report as number 11 out of 35 [60]. It points out Sweden's good results in medical outcomes and its poor results concerning accessibility and waiting times [60]. The increasing frequency of multi-morbidity becomes highly relevant for the organisation of health service delivery: in the industrialized world, as many as 25% of 65-69-year-olds and 50% of 80–84-year-olds are affected by two or more chronic health conditions simultaneously [6][46]. These co-morbidities, which include mental health problems, addictions and violence, make it necessary to deal with the person as a whole [31][32]. In addition, health inequalities in Sweden have increased in the recent past, similarly to many other countries. For example the gap between 20-year-old men from the highest and lowest socioeconomic groups

regarding difference in life expectancy widened by 88% from 1980 to 1997 [61].

Health systems worldwide will have to deal with the expanding need and demand for care for chronic and non-communicable diseases, requiring the establishment of better possibilities for comprehensive care while simultaneously containing costs [6][62][63]. Several reports have indicated that the current developments, with non-sustainable healthcare systems, lead to gigantic challenges [64][65][66]. The response of healthcare authorities to prepare or adapt to these changes has been too slow or inadequate despite the fact that trends are well documented [67]. Although the primary care sector in Sweden has a high performance rate, is well organised and has providers are ideally placed to meet the needs of patients with one or more long-term conditions, a recent OECD report (2013) states that improvements are necessary if it is to act as a care co-ordinator across complex clinical pathways [53]. Moreover two recent reports from the Swedish Medical Association stated there is an enormous lack of General Practitioners at Swedish primary healthcare centres, even though Sweden belongs to the OECD countries with the largest number of physicians in relation to population [68][69]. An additional 1,400 full-time GPs are needed (that is, 30% more) to join the current 4,784 GP (2012, converted to full-time) to meet the actual demand [69]. The large differences in physician density that exists between and within counties imply that the population is not offered primary care on equal terms. An interactive map by the Swedish Medical Association demonstrates these differences clearly [70]. Concurrently the number of physicians training to become GPs is far too low to cover the future demand considering that a large proportion of current GPs are due to retire soon [69]. Additionally recent reports indicate that GPs feel increasingly overburdened as a result of the lack of colleagues leading to a vicious circle with those centres who have a shortage of GPs are at high risk to loose even more [71][72][73].

Health systems internationally are influenced by powerful forces that override rational priority-setting and therefore do not spontaneously develop towards systems that support primary healthcare values [74]. Today's trends are characterized by: a disproportionate focus on specialist, tertiary care, often referred to as "hospital-centrism"; fragmentation, as a result of the multiplicity of programmes and projects; and the pervasive commercialization of healthcare in unregulated health systems [6].

As hospitals gained a pivotal role during the last century, we find today a disproportionate focus on hospital care, technology and sub-specialisation

that became a remarkably resilient source of inefficiency and inequality [6][75][76]. The 35% growth in the number of doctors between 1990 and 2005 in OECD countries contained a 50% increase of specialists compared with only a 20% increase in general practitioners [65]. Professional tradition and interests and the considerable economic weight of the health industry drive this growth in the hospital sector [6]. The health industry´s role is reflected in an international annual growth rate of the equipment market at over 10% and global pharmaceutical sales with a growth rate of 6–7% [6]. Despite all these investments, experience has shown that a disproportionate focus on specialist care provides poor value for money [6][75]. Experience has also shown that hospital-centrism carries a considerable cost in terms of unnecessary medicalization and iatrogenesis, thus compromising the human and social dimensions of healthcare [6][75][77].

Single-disease control initiatives in a command-and-control management manner with parallel funding mechanisms lead to competition between scarce resources and staff attention, while structural problems of health systems are hardly addressed [6]. An example in Swedish healthcare is dementia registry with its economic incentives that led to prioritization conflicts since registering produced extra compensation but took the attention away from the patient's current situation or problems [78].

Unregulated commercialization - proved to lead to health systems that are highly inefficient and costly and that exacerbate inequality – has hardly been seen in Sweden. However discussions on the regulations of privatization trends are highly topical in the recent years [17][79][80][81]. The latest reform in primary care in Sweden, which included the freedom of establishment leading to increased privatization, can be seen as an attempt to correspond to the rising social expectations of the general public on performance and the co-ordination of care, and also that services should be focused on people’s needs [6][53].

However, some professionals have expressed their concerns about the fact that private healthcare providers can be profit-making organizations, partly owned by international investment companies, and they have warned about risks of degrading quality and increasing inequality [82][83]. Different Swedish authorities have studied the effects of the reform but the results are equivocal. For example, while a report by The Swedish Agency for Health and Care Services Analysis saw no clear signs of absolute displacement effects (that certain patient groups increased their utilization of health services while others reduced it) and stated that the population as a whole had increased its utilization to a greater extent than people with major care needs,

a more recent report by the Swedish National Audit Office showed displacement effects in favour of healthier patients [17][84]. As the degree of privatization in healthcare in most of the European countries is increasing, a number of studies have been carried out to evaluate its effects. However, a recent review found that the evidence concerning the recurring questions on privatization is weak and mixed [85][86]. The effects of substantial changes in the public-private mix in Swedish primary care have been difficult to predict, not least because of the lack of data and neglect of research in this field that have hindered informed policy-making [87].

1.6 Meeting the demands

In order to "put people at the centre of healthcare" the primary healthcare movement tried to provide rational, evidence-based and anticipatory responses to health needs and the social expectations of populations [88][89][90]. Therefore it is necessary that health systems must respond to the challenges of a changing world and growing expectations for better performance [6]. However, it has been shown that public spending on health services most often benefits affluent groups more than vulnerable groups of societies [91][92][93]. Additionally, people with the most means – whose needs for healthcare are often less – consume the most care, whereas those with the least means and greatest health problems consume the least, known as the inverse care law [94][95].

The experiences from the past and the emerging future challenges make it clear that a transformation of healthcare systems is necessary (business as usual for healthcare systems is not a viable option) and that the implementation of changes is highly complex [6]. In order to fulfil the four pillars of the right to health - availability, accessibility, acceptability and quality – state parties have to ensure that new health policies will do not harm, either by the type of intervention or by third parties (non-state actors) involved, and that they will actually lead to improvements [2][3]. The WHO identified five key elements to achieving this goal and described the corresponding reforms that are necessary to take a step forward [4][6]:

- Reducing exclusion and social disparities in health (universal coverage reforms)
- Integrating health into all sectors (public policy reforms)
- Organizing health services around people's needs and expectations (health service delivery reforms)
- Pursuing collaborative models of policy dialogue (leadership reforms)

- Increasing stakeholder participation

The areas of universal coverage and integration of health into all sectors are relatively well developed in Sweden [46][53][60][96][97]. According to the Health and Medical Services Act, the Swedish system provides coverage for all residents of Sweden, regardless of nationality, and in addition, emergency coverage is provided to undocumented migrants and all patients from a number of countries with bilateral agreements [97]. In 2003 the Government adopted a Bill entitled "Public Health Objectives" which aimed to create social conditions to ensure good health, on equal terms, for the entire population in order to improve public health and reduce differences in health between various population groups [97]. Programmes were targeted at preventing HIV/AIDS, the harmful effects of alcohol, drug and tobacco abuse and gambling addiction, and they promoted physical activity, healthy diet habits and sexual and reproductive health involving almost all government agencies and several registers which cover the different aspects of the health status of the citizens [97].

However, despite these achievements in the first two areas, there is still a great potential for improvement in Sweden in the remaining areas: the organization of primary healthcare services around people's needs and expectations (health service delivery) and the development of systems for governance and stewardship that support primary care goals and are based on collaborative models of policy dialogue between the stakeholders involved [6].

This discrepancy between well-developed and under-developed areas of primary care reforms and the experience that earlier approaches to ensure and improve quality at primary healthcare centres have been of limited success, shows that the theoretical framework for understanding change processes in primary healthcare centres has been deficient and needs more research [98][99]. Organizations were often expected to be predictable with potentially controllable components, while a body of interdisciplinary research provides evidence that primary healthcare centres can be understood as complex adaptive systems consisting of agents such as patients, office staff, and physicians, who interact dynamically and enact internal models of income generation, patient care, and organizational operations [98][99]. The immense variation between centres' internal mechanisms represents the unique adaptations to the values and needs of the people involved, including the interactions with the local community and healthcare system [100]. It also explains why some strategies work in particular centres, while they do not work in others [99].

Primary care is characterized by a further peculiarity: while the pursuit of excellence in specialized care has led to an increasing sub-specialization with narrowing ranges of responsibility, primary care cannot choose that path by definition [20]. It has to find other ways to cope with the increasing amount of medical evidence and options for diagnostics and treatment. Instead of using demarcation techniques, the General Practitioner has to embrace comprehensiveness and complexity while accepting and handling increasing uncertainties [101]. The internal mechanisms in the process of decision-making in primary care are therefore constantly being adapted to the total current situation, not only including the patient's condition but also the allocation of resources such as diagnostic technology and a decision's potential effects on the healthcare centre's economy caused by regulations and reimbursement schemes [102][103][104]. This balancing mechanism in the complex adaptive system of primary care also explains why interventions or reforms with a single target – i.e. accessibility or the highlighting of a single disease such as dementia – often lead to unwanted and hardly controllable side-effects in other parts of primary care service delivery, similar to effects in whole healthcare systems [105]. Thus effective primary care reforms need holistic approaches that will meet this complexity by engaging at various points concurrently and by being adaptive through constant discussion and negotiation with all stakeholders involved.

This thesis focuses therefore on two important intertwining reforms aiming to ensure and improve the quality of Swedish primary healthcare centres as describes the aims of this thesis. Papers I and II deal with the subject of health service delivery reforms, studying specifically the quantitative and qualitative effects of an approach to improve accessibility and the utilization of human resources at primary healthcare centres. Papers III and IV deal with the subject of leadership reforms, studying specifically the quantitative and qualitative effects of a recent primary healthcare reform aimed at strengthening the role of the patient and improving performance in terms of access and responsiveness. In chapters 1.7 and 1.8 the underlying theories and methods for these two intertwining reforms are explained.

1.7 Improving health service delivery

1.7.1 Improvement science: expectations

In many industrial sectors it has been common for several decades to use methods of quality improvement in order to achieve better results. In healthcare, Improvement Science has been become more popular only in the last two decades together with Health Services Research and Implementation

Science [106][107]. In particular, the reports "To err is human" and "Crossing the quality chasm" have made it clear that there is a need for new methods to improve the quality of care [64][108]. New medical evidence from the science of disease biology will not automatically lead to the delivery of high quality care for the patient. These relatively new methods aim to promote understanding of change processes in healthcare in order to achieve better patient outcomes (health), better system performance (care) and better professional development (learning) [106]. By analogy, just as traditional scientific evidence is used by the engineering sciences to solve problems in the real world, implementation and improvement science translate evidence from the science of disease biology into systems and processes to improve clinical practice and the delivery of care. These methods attempt to promote patient safety and the efficient use of resources. They consider the specific clinical context, use performance measurements and evaluate plans and strategies for implementation [106]. The approach is therefore often stepwise and iterative and includes a battery of different tools. The initiative to improve health service delivery was inspired by the principles of different quality improvement tools and methodologies that were used in an eclectic approach during development of a new patient-sorting system and that are presented in the following.

Ishikawa diagram

Ishikawa diagrams (also called fishbone diagrams or cause-and-effect diagrams) have the appearance of a fishbone and are used to visualize causes of a specific problem or event. This tool was developed in the early 1940s by the Japanese scientist Kaoru Ishikawa and is usually used in teams to identify root causes of a problem [109]. It has the advantage that it is relatively easy for a whole team to use and thus promotes participation. Its disadvantage is that it does not take the interactions of various causes into account. It can be used as a starting-point for a quality improvement project in order to assess the specific causes to be addressed in the project. Figure 8 shows an example of an Ishikawa diagram that was used to illustrate the causes of a low access rate.

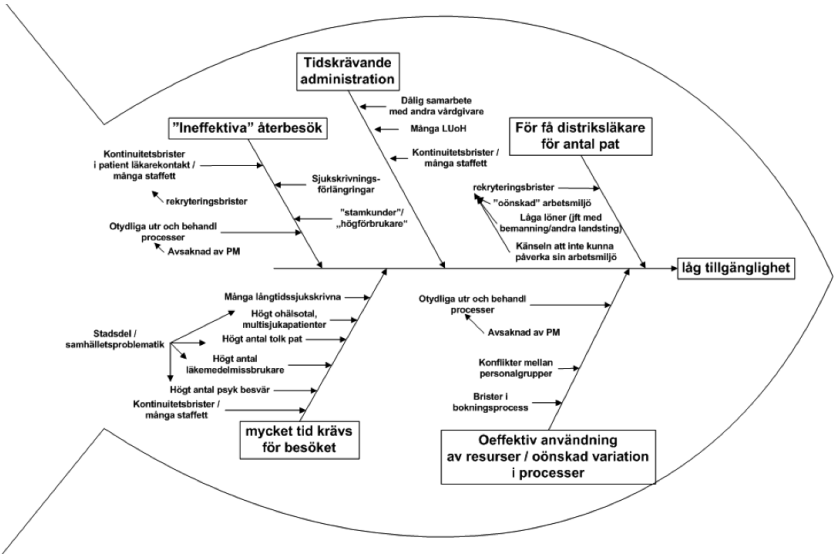


Figure 8. Ishikawa diagram visualizing the causes for a low access rate (in Swedish). By Andy Maun (own work) 2009

The Plan, Do, Study, Act (PDSA) Cycle

The PDSA Cycle (sometimes also termed PDCA cycle with C standing for Check, also known as the Deming Wheel or Shewhart Cycle) was popularized by William Edwards Deming (1900–1993), an American physicist and statistician whose work has significantly influenced the current status of quality management [110]. It is a tool for continuous improvement which is now regularly used in healthcare settings and based on three core questions [107]: 1) What are we trying to accomplish? 2) How will we know that a change is an improvement? 3) What changes can we make that will result in an improvement?

It consists of four successive steps:

- Plan: A plan for improvement is formulated based on analysis of the actual situation and its shortcomings. During this step team members are involved in the development of the draft plan. Variables are determined to check whether the goal is achieved or not.
- Do: During this phase the plan is not implemented for the entire unit but tried out on a small scale and adjusted if

necessary. Regular measurements of the variables carried out.

- Study/Check: The results obtained from the first two steps are compared and studied by means of the periodic measurements with set goals. Deviations are discussed and the plan is adjusted accordingly.
- Act/Learn: The new process is introduced as standard for the whole unit and continuous measurements of the target variables are carried out to ensure that the improved results are sustained. If the implementation was not successful, the team needs to re-think (Learn) and to readjust the plan for next round of the cycle.

The four steps of the PDSA/PDCA cycle are reiterated a number of times to ensure continuous improvement and make possible necessary adaptations if conditions change. Figure 9 illustrates the implementation of the PDSA/PDCA cycle.

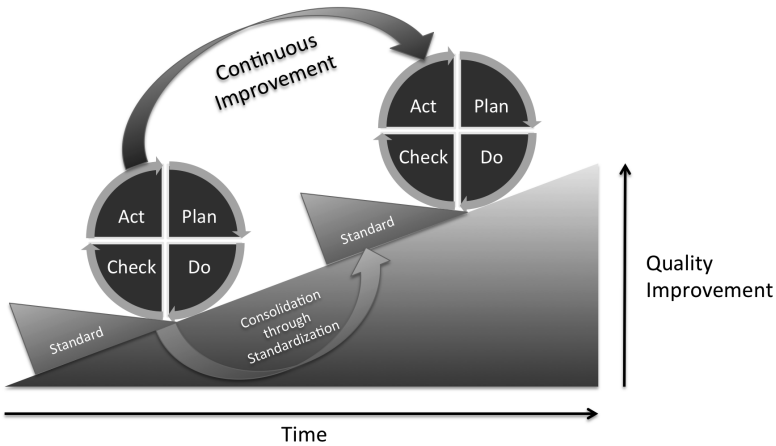


Figure 9. *Depiction of the PDCA cycle. By Johannes Vietze (Own work) CC-BY-SA-3.0 via Wikimedia Commons*

Six Sigma

Six Sigma is a set of data-driven tools and techniques for process improvement in manufacturing that is based on interpretation of statistical methods used by Japanese companies in the 1980s. Six Sigma aims to eliminate causes in production processes that lead to unwanted variation thus causing defects. It uses statistical methods and creates an infrastructure for the personnel within the organization indicating the degree of expertise ("Champions", "Black Belts", "Green Belts", "Yellow Belts", etc.). The name Six Sigma originates from a statistical term describing the idea of reducing the defect rate of a production process to the level of only 3.4 defective outcomes per one million opportunities, which means that 99.99966% of the targeted outcomes or products are defect free) [111][112]. The Six Sigma doctrine assumes that processes can be measured, analysed, improved and controlled. Stable and predictable processes are important for success. It further expects the entire organization, in particular the top management to commit themselves to the goals. In contrast to previous improvement methods Six Sigma focuses on measurable and quantifiable results (including financial results), emphasizes strong and passionate management leadership and support, and demands decision- making based on verifiable data rather than assumptions. Six Sigma uses a methodology inspired by the PDSA cycle and has five phases:

- Define (project goals)
- Measure (collect relevant data)
- Analyze (find cause-effect relationships, seek out root causes for the defect)
- Improve (optimize the processes based on the data analysis)
- Control (ensure stable processes and enable control systems to be implemented)

Recently the model was further developed in a healthcare context [113]. In the last step of the cycle the phase “Learn” was added, including a summing-up of the project hitherto and the group members’ reflections on the lessons learnt during the cycle.

The Six Sigma methodology has been adapted to healthcare settings where variability is much more difficult to quantify compared to industrial processes due to the fact that patient care significantly involves the human element. Nonetheless a number of Six Sigma projects have been successfully carried out in healthcare including capacity issues in X-ray rooms, reduction

of bottlenecks in emergency departments, increase of the accuracy of laboratory results and reduction of medical errors [114].

Lean Thinking

Lean Thinking has its origins in lean manufacturing that derived from the Toyota Production System developed by Taiichi Ohno and Eiji Toyoda between 1948 and 1975 [115]. It is a production philosophy which includes both operational and socio-technical aspects and in which the creation of value for the end customer is central. All activities that use resources and do not contribute to value creation are considered as waste (muda) and should therefore be eliminated. Lean Thinking focuses on continuous improvement and respect for people. The five principles of Lean Thinking can be describes as [116]:

- Principle 1: Provide the value customers actually desire
- Principle 2: Identify the value stream and eliminate waste
- Principle 3: Line up the remaining steps to create continuous flow
- Principle 4: Pull production based on customers' consumption
- Principle 5: Start over in a pursuit of perfection 'perfect value provided with zero waste'

The eight types of waste (muda) in Lean Thinking can be described as [117]:

1. Defects - Products or services that do not meet specifications and that require resources to correct.
2. Overproduction - Producing too much of a product before it is ready to be sold.
3. Waiting - Waiting for the previous step in the process to be completed.
4. Non-Utilized Talent - Employees not effectively engaged in the process
5. Transportation - Transporting items or information from one location to another despite their not being required to perform the process.
6. Inventory - Inventory or information that is sitting idle (not being processed).
7. Motion - People, information or equipment in unnecessary motion due to workspace layout, ergonomic issues or searching for misplaced items.
8. Extra Processing - Performing any activity that is not necessary to produce a functioning product or service.

Lean Thinking has shown the potential to improve healthcare delivery when contextual considerations are taken into account such as the difficulty to define value (the patient's perceived value *vs* the doctor's clinical value *vs* the manager's operational value). Otherwise implementations might fail and may lead to even more resistance to change [118]. In healthcare, passive and negative waiting-time (patient's condition remains unchanged or is likely to worsen) can be identified as waste as can unnecessary administrative contacts or uncoordinated back-and-forth flows for the patient between different professionals. More recent developments attempt to integrate Six Sigma and Lean Thinking into Lean Six Sigma [119].

1.7.2 Improvement science: disappointments

While expectations towards Improvement Science have been high and there is e.g. an agreement about the potential of Lean Healthcare for relevant improvements, it remains a challenge to evaluate the new approaches in a more critical perspective [120]. Significant contextual differences between healthcare and manufacturing – such as e.g. the determination of "customer value" – are believed to be reasons that have hindered the broad success of quality improvement tools in healthcare and in some cases even have led to stronger resistance to change [121]. Using an all-too-technical perspective on the delivery of services and a one-dimensional application of typically n-step quality improvement tools including terminologies foreign to health professionals, are signs of inadequate adaptation to contextual organizational culture [113]. Action research approaches have been shown to integrate the lessons learnt into these methodologies and to lead to further development [113]. Unfortunately the past teaches us that quality improvement projects in primary care frequently do not attain the targeted results but remain in their initial stages, and that knowledge from evidence-informed improvement and healthcare service research remains invisible to the people who most need to use it [122][123]. Therefore the transformation of primary care practice remains a demanding process requiring continual reflection, careful tailoring of interventions and ongoing attention to the quality of interactions among those working in the practice [124].

1.7.3 Organizational culture and teamwork

Through the lessons learnt from unsuccessful improvement projects, it becomes apparent that organizational culture with an emphasis on teamwork has to be taken into account in order to achieve healthcare improvements [125][126]. Although they work together in the same groups within an organization, the team members' constructions of other professions' roles,

values and motivations can be dissonant with those professions' own constructions of themselves [127]. Teamwork can be understood as a dynamic process of healthcare professionals with complementary backgrounds and skills sharing common health goals and making concerted efforts in patient care through interdependent collaboration, open communication and shared decision- making [128]. There is evidence that practice-based inter-professional collaboration interventions can improve healthcare processes and outcomes such as superior clinical care in diabetes mellitus, more positive patient evaluations and self-reported innovation and effectiveness [129][130][131]. Moreover after the accomplishment of creating quality improvements, the next challenge follows: to sustain the improvements achieved. True cultural transformations into highly developed and effective teams make organizations more prepared for and resilient to any fallbacks [132].

1.8 Improving governance

Even if health service delivery reforms at primary care centres can significantly be attributed to improvements in accessibility and quality of care, primary care centres are always embedded in a health system, and thus dependent on services regulations and reimbursement schemes. If these two levels are not aligned properly, changes do not gravitate spontaneously towards primary healthcare goals, but to the goals which are favoured by the existing regulations [6]. Therefore the ultimate responsibility lies with governments for creating conditions that shape systems which protect health, guarantee access to healthcare, safeguard people from the impoverishment that illness can bring, and correct market failures that characterize the health sector [6][66][133].

However, and not infrequently misunderstood, this shaping does not mean that governments should reform the entire health sector on their own, but instead should involve the many different actors necessary in this process: national politicians and local governments, the health professions, the scientific community, the private sector and civil social organizations. Additionally, decisions cannot be solely based on social and political considerations, but must also integrate key economic actors – the medical equipment industry and the pharmaceutical industry and their professions – in order to create a viable health market, as a costly modern health economy cannot be sustained without risk-sharing and a pooling of resources [6].

While traditional health governance, characterized by command-and-control management and mere administration, has proved to be ineffective in the

highly complex domain of health systems, experiences have shown that collaborative models of policy dialogue with multiple stakeholders and effective stewardship are a more effective in mediating the social contract between institutions of medicine, health and society to address current and future complex health challenges [6][134][135][136]. This process of bringing together the decision-making power of the political authorities, the rationality of the scientific community, the commitment of the professionals, and the values and resources of civil society is demanding in terms of time and effort, but can lead to sustainable results as the legitimacy of policy choices depends primarily on procedural fairness and transparency [6][137][138]. Constant access to relevant and reliable information and studies on the usage, performance and quality of the primary care system are crucial to support informed policy-making that can reduce discussions that are rather based on single cases or assumptions and ideologies. These information systems are however only partly available today and need further development [53].

1.9 Context of Papers I-IV

1.9.1 Primary care in Region Västra Götaland

Region Västra Götaland, is a Swedish county located on and inland of the west coast of Sweden. With nearly 1,620,000 inhabitants (16.9% of the Swedish population), it is the second largest province in the country in terms of population. Its regional capital is the metropolitan area of Gothenburg with approximately 920,000 inhabitants. After a national political decision all counties were obliged to introduce a primary care system that enabled the population to have freedom of choice regarding healthcare provider and made possible the freedom of establishment. Region Västra Götaland carried out the healthcare reform in October 2009 and the number of PHCCs contracted in the region rose immediately from 143 to 205, of which 200 were still in business one year later. The proportion of privately owned PHCCs in the region rose from 18% to 42% (mainly in the metropolitan area of Gothenburg) leading to increased competition between providers [17]. In 2014 the 201 contracted primary centres (114 publicly owned and 87 privately owned) provided care for 99.9% of the county's population.

After the most recent reform the primary care system underwent a transition from a traditional budgetary system to a comprehensive, fixed capitation payment system, through which providers receive payment mainly for the number of registered patients and their estimated 'illness burden'. The later is calculated by the Adjusted Clinical Groups® (ACG) system, a method that

measures health status by grouping diagnoses into clinically cogent groups aiming to assign each individual a single, mutually exclusive ACG value, which is a relative measure of the individual's expected or actual consumption of health services [139][140]. However, it has been shown that the usefulness of the ACG system appears to be sensitive to the accuracy of classification and coding of diagnoses by physicians [141]. Moreover, the reimbursement system also included additional compensation for primary healthcare centres in deprived or rural areas and a small proportion (approximately 3%) based on a pay-for-performance system. The number of patient visits had no influence on primary healthcare centres' compensation.

1.9.2 The Biskopsgården Primary Healthcare Centre

The Biskopsgården Primary Healthcare Centre is located in a segregated suburb of Gothenburg with a less affluent population representing more than 100 different ethnicities. In 2008 the Centre provided primary care for approximately 23,000 inhabitants and had about 50 employees including the different professions General Practitioners (GP), nurses partly with specialization (asthma, diabetes, district nurse) and a rehabilitation team consisting of physiotherapists, psychologists, medical counsellors and occupational therapists. Two years earlier the centre grew abruptly in size through a financially enforced merger with a neighbouring primary care centre. Due to a number of reasons (financial problems, more difficult working conditions related to the listed population, leadership problems, nationwide lack of General Practitioners) the Primary Care Centre had severe recruitment problems and a lack of GPs leading to a low accessibility. Vacant GP positions were filled with agency locum physicians. In order to improve its low access rates and to use its professionals more efficiently, the centre remodelled its processes by using different Quality Improvement Tools and introduced a structured patient-sorting system in 2008-2009. To date the system has been in use for five years and has adapted regularly to changing circumstances.

2 AIMS

This chapter explains the general and specific aims of this thesis.

2.1 General aim

The general aim of this thesis is to study the effects of two approaches that attempt to match increasing demands from an aging population in terms of quality and accessibility while concurrently dealing with a growing shortage of general practitioners. It studies the effects of i) an initiative for improved health service delivery – the introduction of a structured patient-sorting system at a primary healthcare centre – and ii) a healthcare reform aiming to strengthen the role of the patient and improve healthcare performance in terms of access and responsiveness through the freedom of choice regarding provider as well as the freedom of establishment for providers.

2.2 Specific aims

The specific aims of the included papers are as follows:

I. The purpose of this study was to increase the access rate to the Primary Healthcare Centre and to make the most efficient use of the staff by introducing a structured patient-sorting system.

II. The aim of this study was to explore staff members conceptions of the structured patient-sorting system in order to gain an inside perspective on this project.

III. The aim of this study was to explore how managers at publicly owned primary healthcare centres perceived the transition of the primary healthcare system and the impact it has had on their work.

IV. The aim of this study was to compare privately and publicly owned primary healthcare centres in Region Västra Götaland on a group level concerning patient perceived quality, rates of purchased prescriptions of antibiotics and benzodiazepine derivatives as well as the percentage of follow-up routines carried out for patients with the chronic diseases diabetes mellitus, chronic ischemic heart disease and hypertension.

3 MATERIALS AND METHODS

This chapter gives an overview over the materials and methods used in Paper I to IV and reflects on methodological considerations during planning of the studies.

Table 1. Materials and methods used in the papers comprising this thesis.

Paper	I	II	III	IV
Design	Quantitative Study: Pilot Project / Quality Improvement project	Qualitative Study	Qualitative Study	Quantitative Cohort Study on the level of Primary Care Centre
Study Group	Biskopsgården Primary Care Centre providing care for ~23,000 citizens	Strategic selection of 11 participants (staff members at Biskopsgården Primary Care Centre)	Strategic selection of 24 participants (managers of publicly owned primary care centres in Gothenburg area)	All contracted primary care centres in the Region Västra Götaland (n=201)
Data Collection Method	Continuous registration, Basic questionnaires	Semi-structured interviews	Semi-structured interviews	Registration data from regional healthcare authorities
Data Analysis	Statistical	Phenomeno-graphy	Content analysis	Statistical
Investi-gation Range	Single primary care Centre providing care for ~23,000 citizens	Single primary care centre providing care for ~23,000 citizens	24 local primary care centres providing care for ~250,000 citizens	201 regional primary care centres providing care for ~1,600,000 citizens

Development of the structured patient-sorting system

Accessibility has been one of the major concerns in Swedish primary care, a problem that is also well known in many other countries [6][17][142]. Furthermore, the ineffective use of competences and the deficiencies in the collaboration between different professions are hindering a better delivery of services [53][64]. An eclectic approach towards the Quality Improvement tools and methodologies was used in the development of a new patient-sorting system. The system was at the same time inspired by the principles of two prior systems: Advanced Access and the Manchester Triage System.

Advanced Access

The Advanced Access model for primary care was developed in the late 1990s at a Kaiser Permanente primary care centre in the United States. It aims to reduce unnecessary waiting times that are often the result of unplanned, irrational scheduling and resource allocation through the application of queuing theory and the principles of industrial engineering, adapted appropriately to clinical settings without requiring additional resources [143]. Its core principle is that if the capacity to provide patient appointments balances the demand for appointments, patients calling to see their physician are offered an appointment the same day [144]. However the implementation of these principles seems difficult, as they are counter to deeply-held beliefs and established practices in healthcare organizations [143]. The six elements of Advanced Access important in its application are: balancing supply and demand, reducing backlog, reducing the variety of appointment types, developing contingency plans for unusual circumstances, working to adjust demand profiles, and increasing the availability of bottleneck resources [143]. Practices using Advanced Access have been able to reduce their waiting times significantly [144].

The Manchester Triage System

The Manchester Triage System is a standardized method for initial assessment in the emergency department. It aims to enable a quick prioritization to be made of all arriving patients so that resources can be used in the most rational way. It attempts to prevent inconsistent triage decisions and events where seriously ill patients in the queue are not detected in time leading to an even more severe condition. In contrast to triage during wartime or a catastrophe, where victims were prioritized for adequate resource allocation, no patient is denied treatment. It was introduced in 1995 in Manchester and rapidly spread to a number of other countries including Sweden. It is a sensitive tool for detecting those who are most seriously ill on arrival at the emergency department and subsequently need critical care [145][146]. Patients are sorted into five colour-coded groups indicating the

degree of urgency ranging from immediate treatment to non-urgent (Table 2). The assessment includes the measurement of vital signs such as heart rate, blood pressure, body temperature, respiratory rate, pulse oximetry and state of consciousness [147]. In terms of quality improvement, the Manchester Triage System attempts to reduce unfavourable variation through standardization and quantification. Furthermore it supports the rational use of human and technical resources and attempts to eliminate activities that do not add value (prolonged waiting times or unnecessary diagnostics for patients with a severe condition).

Table 2. Manchester Triage System, Groups and Colour-coding

Group	Colour	Assessment	Max waiting time
1	Red	Immediate Resuscitation	0 minutes
2	Orange	Very Urgent	10 minutes
3	Yellow	Urgent	30 minutes
4	Green	Standard	60 minutes
5	Blue	Non-Urgent	120 minutes

Although the Manchester Triage System and the Advanced Access model seem contradictory at first sight, both approaches include components that can be easily connected: adequate prioritization through a triage system to the appropriate level of care with different appointment types can be combined with same-day appointments if the contingency is adjusted and bottlenecks are eliminated. A PubMed search showed no publications, which include both terms and refer to cases in which this combination had been tried earlier.

Iterative development design

The structured patient-sorting system was developed through regular interdisciplinary team meetings in parallel operational groups of 10-15 members including the whole staff of the Biskopsgården Primary Care Centre. The practice managers and informal team leaders briefly introduced the staff to the main principles of these methods but avoided introducing new terminologies or associated hierarchies. The groups defined the problems to work on and tried to find solutions that would fit their specific situation. Eventually the groups presented their results to the whole staff and the management suggested a plan that included a number of different suggestions on which the majority of members agreed. Small-scale implementations of the new system were tested and evaluated before large-scale implementations were launched. Recurring discussion meetings led to adaptations and

refinement of the system. Figure 10 illustrates the iterative character of the development process.

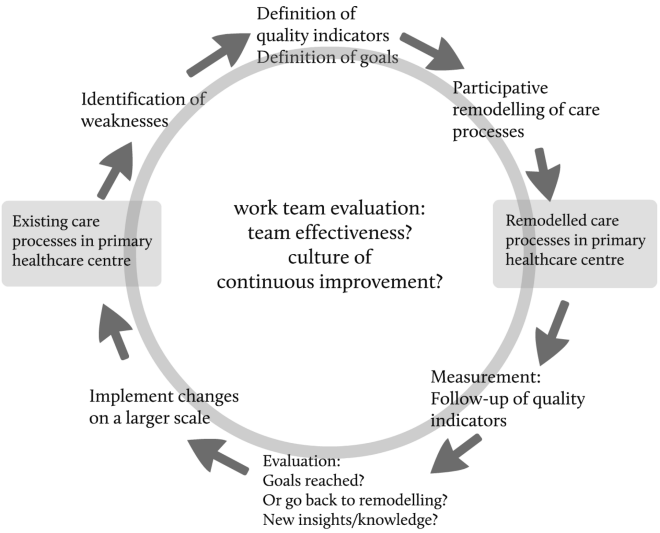


Figure 10. Iterative development process of the structured patient-sorting system. By Andy Maun (Own work). 2014.[148]

In the following, the specific parts of the quality improvement tools and methodologies that have been used during the implementation process are presented:

- The colour-coding principle of the Manchester Triage System was adopted and made to conform to the conditions usually seen in primary care. The idea was to establish a system that ensured that patients with severe conditions such as e.g. acute chest pain or serious breathing problems could be identified on arrival leading to a routine where the patient is immediately seen by a GP instead of sitting in the waiting room. On the other hand, patients with conditions of less urgency that did not necessarily need the involvement of a GP could be sent to other professionals such as physiotherapists or psychologists. A manual including colour-coding and clear algorithms was developed and constantly used by all nurses who triaged patients at the front desk or on the telephone.

- The core principles of the PDSA cycle were used: participative planning, small-scale implementation, initially including evaluation and reflection meetings, and finally large-scale implementation.

- Only parts of the Six Sigma methodology were used, excluding the hierarchical infrastructure and demand to produce financial savings. Actions inspired by Six Sigma included regular measurements of quantifiable data (number of visits at the different reception types, number of registered diagnoses at the drop-in reception, number of patients referred by Physiotherapists and Psychologists to GPs, short questionnaires to patients and staff on perceived waiting time and quality), data-based planning (human resources planning based on measurements) and the effort to reduce unwanted variation in the booking process through the development of routines and a manual (the aim of the booking procedure is to be based primarily on the patient's condition and independent of the person who is carrying it out).

- The core principles of Lean Thinking were used: the establishment of a drop-in reception with short waiting times originated in the customer's perspective - patients demanded for quick access to care for minor complaints such as airway infections and tended to seek other care providers when waiting times were prolonged. The under-utilized skills of physiotherapists, psychologists and nurses have been used more efficiently. In the pursuit of undisrupted flows, patients' paths between the front desk, consultation room and laboratory were optimized. The integration of context-specific conflicting issues such as positive waiting times (patient's condition is likely to improve without treatment) has been attempted e.g. through the possibility to offer patients a shortcut for a guaranteed re-assessment within a week if the condition did not improve.

Paper I describes the remodelled processes and quantitatively compares the access rates before and after the introduction of a structured patient-sorting system. Furthermore it shows the results of short patient and staff questionnaires on perceived accessibility. Paper II is a qualitative analysis (content analysis) of the conceptions of eleven primary care centre's team members of the structured patient-sorting system. Interviews were conducted one and two years after the introduction of the new system.

3.1.1 Quantitative assessment – Paper I

Data collection and analysis in Paper I

In order to compare access rates before and after the introduction of the structured patient-soring system, the number patient of visits to the different groups of professionals was retrieved from the medical records using a statistical programme (HEKLA). By the time the study was conducted, due to the stepwise introduction, the new system had existed for 10 months for the rehabilitation team's reception and for 6 months for the GP and nurse receptions. The corresponding periods from the previous year were taken as references. The changes were expressed in per cent both for the whole Primary Care Centre and for each professional subgroup.

The percentage patients treated solely by the rehabilitation team was calculated through the continuous registration of the number of patients who were initially sorted to the rehabilitation team and numbers of patients who did or did not see a GP for the same condition respectively.

Six months after introduction of the new system, all staff members received a short questionnaire concerning their working situation and their perception of accessibility. The questionnaire had a scale from 1–10. The range 6–10 was interpreted as very good/good, the range 1–4 as bad/very bad and 5 as neither good nor bad. 756 patients who came in contact with the Primary Care Centre successively six months after the introduction also received a short questionnaire concerning their perception of accessibility. A further 94 randomly selected patients who came in contact Primary Care Centre ten months after the introduction received a further short questionnaire concerning their perception of accessibility and quality.

All diagnoses at the GP drop-in reception were registered in order to observe whether or not patients were sorted appropriately at the reception.

In order to observe whether or not the newly-introduced GP-drop in reception was associated with an irrational antibiotic use, the number of all antibiotic treatments at the GP receptions for a 4-week period was registered including the indication and the chosen drug.

Outcome variables in Paper I

In the following the outcome variable in Paper I are presented:

- The number of patient visits to the different groups of professionals under a certain period

- The percentage of patients treated solely by the rehabilitation team

- The results of short questionnaires for patients and staff concerning perceived accessibility and experiences with the structured patient-sorting system.

- The number of the ten most frequent diagnoses at the GP drop-in reception six months after the introduction

- The percentage of antibiotic treatments at the GP drop-in reception for airway and urinary tract infections that were not in accordance with national guidelines.

3.1.2 Staff members' conceptions – Paper II

The results achieved after the implementation of the structured patient-sorting system as described in Paper I make it relevant to understand the underlying conceptions of staff members, using a qualitative method. In order to grasp the various conceptions of this heterogeneous group of professionals a phenomenographic approach was chosen.

Phenomenography

Phenomenography is a qualitative research methodology that appeared in the early 1980s in the context of educational research and was popularized by Ference Marton [149]. It investigates the qualitatively different ways in which people experience something or think about something [150]. It originates from the idea of two orders of perspective: the first being how the world actually "is", and the second how this world is conceived. The second order of perspective is the in the focus of the phenomenographic approach, due to the fact that a phenomenon can be experienced in qualitatively different ways [151][152]. The approach has been used in healthcare research to a modest extent to study healthcare professionals' conceptions of treatments and relations to patients, patients' conceptions of illness and investigations on team effectiveness [153][154][155][156]. Literature indicates its underestimated potential for qualitative healthcare research [157].

Methodological considerations in Paper II

In order to ensure a broad and comprehensive understanding of the various conceptions, the eleven participants were selectively chosen representing all the different professions (Table 3). This broad approach also applied for the research team that consisted of members with had a clinical background in different medical professions. Both researchers with inside knowledge of the

Biskopsgården Primary Care Centre and those who had no affiliations participated in the analysis. To ensure that conceptions were not only spur-of-the-moment ideas, six participants were interviewed one year after the full introduction of the new system and five of these again the following year. The interviewers had no previous affiliations with the Primary Care Centre and used the same interview guide (Table 4) in all interviews to prevent suggestive questioning in the follow-up interviews. The COREQ 32-item checklist for qualitative studies was used to assure the quality standards for this study [158].

Table 3. The participants and durations of the interviews in Paper II

Gender	Profession	Interview duration 2010	Interview duration 2011
f	Nurse	45 min	41 min
f	Nurse	45 min	45 min
f	Physiotherapist	45 min	48 min
f	Physiotherapist	45 min	47 min
f	Manager	45 min	37 min
m	Physician	45 min	---
f	Nurse	---	46 min
f	Nurse	---	46 min
f	District Nurse	---	46 min
m	Physician	---	53 min
f	Psychologist	---	46 min

Table 4. *The interview guide covering questions on different aspects of the new system.*

What is your profession? How long have you been working here? Do you have other earlier professional experience?
How is it to work with the structured patient-sorting system? How was working here before?
In general, what do you think about the structured patient-sorting system? Can you give examples when it worked well? What was the reason for that? Did you experience that it made work more difficult? How did you handle that?
You started working in a new and different way, where there any changes in the results? Tasks - How did your work tasks change? Collaboration - How did collaboration change? Professional role - Has it influenced your professional role?
How did patients respond to the new system?
What was your most important experience with the new system?

Data analysis in Paper II

The extensive interview material of the 16 interviews contained 725 minutes that were transcribed verbatim and imported to the software MAXQDA 10™. Four researchers read the material several times to obtain a sense of the whole. Three of them continued with coding which included labelling of utterances of interest, sorting related quotes into piles and eventually making explicit the criterion attribute for each group. Labelled quotes were arranged, rearranged and narrowed into 5-7 draft categories by each researcher. The individual findings were discussed and compared to ensure validity, reliability and consistency. After that the data was synthesized by principal author who wrote up the findings and by regular presentations of refined draft categories for the whole research team. The quality of the phenomenographic outcome space was ensured by taking into account that each category in the outcome space revealed something distinctive about the way of understanding the phenomenon. The critical variation in experience observed in the data was represented by a set of as few categories as possible, in this case three categories of description supplied with representative citations (Table 5 illustrates an example) and an overall perspective of the phenomenon [159].

Table 5. Data analysis example using the phenomenographic approach

Quotation	Label	Category of description
We have got much better when it comes to an understanding of each other, it's very important to be able to cooperate in the best possible way. So you have to know what the different professions actually do in their everyday work.	Mutual understanding of professional competences as an important component of teamwork	The system was visualized as being a promoter of professional development and a shared ideal of cooperative practice.

3.1.3 Primary care in transition – Paper III

As many of the publicly owned PHCCs were forced to downsize and transform their organizations, these effects were particularly noticeable in the metropolitan region of Gothenburg, which had the highest number of newly established healthcare centres. In order to understand how managers at publicly owned primary healthcare centres with patient populations ranging

from 8,000 to 20,000 perceived that transition and which impact it has had on their work, a qualitative study with 24 managers of publicly owned primary healthcare centres was conducted using content analysis inspired by Silverman [160].

Content analysis

The method of content analysis originates from the American political scientists Harold D. Lasswell and Paul Lazarsfeld who developed and used the method in the 1920s and 1930s to analyse systematically extensive amounts of text material about war propaganda in mass media [161]. While the method was initially used as a systematic and quantitative approach to describe the manifest content of communication, it later developed to include interpretations of latent content [162]. This qualitative approach of content analysis is predominantly used in Nursing and Education research. A variety of different traditions developed over time and there are different opinions concerning meaning and the use of concepts, procedures and interpretation in qualitative content analysis based on historical points of view or various beliefs concerning the nature of reality [162]. In Paper III a rather systematic approach inspired by David Silverman was chosen [160]. In order to meet the demands on quality considered essential by Kirsti Malterud the COREQ 32-item checklist for qualitative studies was used to assure the quality standards for this study [158][163].

Methodological considerations in Paper III

In order to investigate the perceived changes, the multidisciplinary research group chose an area where the changes had been most drastic: The metropolitan area of Gothenburg where competition was most obvious through the high number of newly established primary care centres. Originally the research group intended to study the perceptions of managers of both privately and publicly owned primary care centres. However, managers from private centres did not participate, declaring heavy workload as the reason for non-participation. Thus we unfortunately have no insight as to the perceptions of managers of privately owned centres. On the other hand it would have been difficult in any case to compare private managers' perceptions of the system change with those of public managers since the majority of privately owned centres were newly established and their managers had in most cases not worked as primary care centre managers shortly before the system change. The study therefore had the opportunity to focus on the system changes as perceived by the relatively homogeneous group of managers of publicly owned centres. Figure 11 illustrates the selection process of the participants. All of them received a written research plan outlining the purpose of the study and they were told that the results

would be presented in a way that would guarantee confidentiality. There were no pre-existing relationships between the interviewers and the participants.

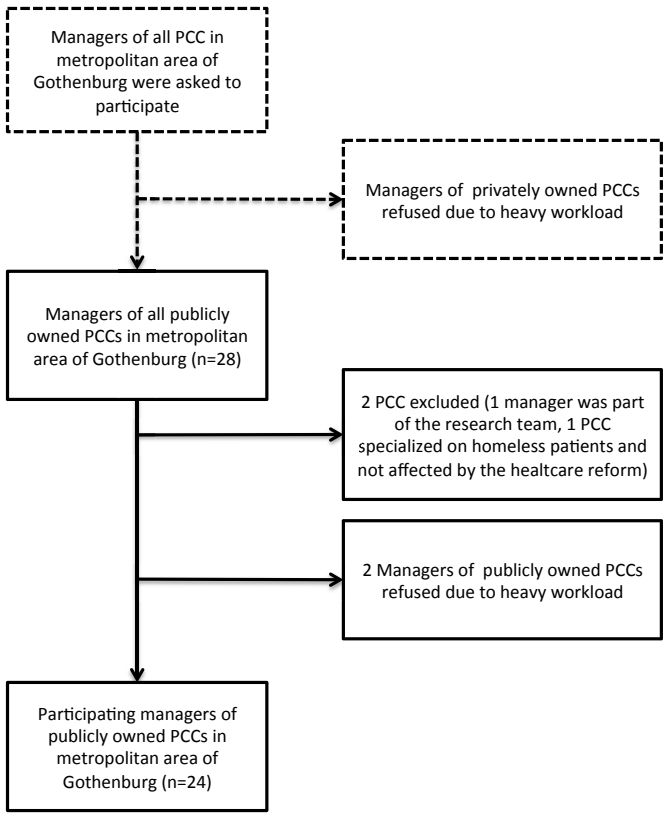


Figure 11. Selection process of the participating managers in Paper III

The 24 participants were between 43 and 66 years of age; 20 were female and four were male. Fourteen participants had a nursing background, seven were GPs, two were physiotherapists and one had a background in social work. Many participants had attended various leadership programmes and the majority had attended programmes that included change management skills.

The 24 interviews were carried out at face-to-face meetings lasting 23–56 minutes in an undisturbed setting in the managers' offices. A semi-structured interview guide was used focusing on the following research questions: 1) How did healthcare managers handle the new situation involving competition between healthcare centres? 2) How were daily routines managed after the transition? 3) Which opportunities and obstacles arose from the transition in terms of further development of the healthcare centres?

Data analysis in Paper III

The interviews were transcribed verbatim and transferred to the software NVivo™ 9. To obtain a sense of the whole, the transcripts were read through several times. Three members of the multidisciplinary research group coded the interviews separately into units of meaning and merged their codes in several rounds of discussions. The manifest content was identified and described, followed by identification and interpretation of the latent content. Categories and subcategories, provided with quotations, were created. Through repeated revision of transcripts and codes the categories were refined with consideration to the various perceptions, assuring consistency with the whole. The research group ultimately identified two core themes. Table 6 illustrates an example from the data analysis.

Table 6. Example from the data analysis in Paper III

Quotation	Sub-category	Category	Core theme
I find that patients have become so demanding: I've read this…; I found this on the internet…; I want this examination…; I want to see the doctor immediately… (6).	Negative experience: unreasonable, demanding patients	Shift of power from the healthcare provider to the 'customer'	Prioritization conflicts arise between patient groups with different needs, demands and levels of empowerment

3.1.4 Influence of ownership type – Paper IV

After the healthcare reform all contracted primary healthcare centres in Region Västra Götaland were reimbursed using the same model regardless of their ownership type. By regulation publicly owned primary healthcare centres are non-profit organisations, whereas privately owned primary healthcare centres have the option of being profit-making organisations, some being owned by large international investment companies. This difference in

concept makes it important to study whether or not the quality of the primary healthcare services available is influenced by the primary healthcare centre's type of ownership. With the given incentives it is likely that centres primarily strive for high patient satisfaction in order to maintain or increase the number of patients listed, neglecting other aspects of quality of care. For example could GPs have been tempted to prescribe antibiotics demanded by patients, even if there was no indication, in order to satisfy patients and to prevent that the might change to another primary healthcare centre. Or GPs could have been prescribing benzodiazepine derivatives to patients who demanded these with the same motivation or in order to prevent time-consuming discussions. The reimbursement system after the reform had also incentives based on the registration of diagnoses. Diagnoses for chronic diseases such as diabetes mellitus, ischemic heart disease or hypertension had a positive impact on the reimbursement. It is thinkable that GPs document these diagnoses for patients without carrying out adequate follow-ups in due to economic pressure and lack of time. These assumptions make it relevant to observe the prescription rates and follow-up rates of primary healthcare centres.

Use of data by the Regional Healthcare Authority to follow performance and quality

The Regional Healthcare Authorities in Västra Götaland which organizes and finances primary care in the county, certified and observed all contracted primary care centres [164]. This included regulation of reimbursement schemes that contain a small proportion (<3%) based on performance and quality indicators for each primary care centre. In order to measure these performance and quality proxies, the Regional Healthcare Authorities collected extensive amounts of data from a number of different sources from 2011 onwards, aggregated it on the level of primary care centres and made it publicly available. These data sources include the primary care centres' electronic administrative systems, the administrative agency Statistics Sweden [165], the national patient survey [166], the National Prescribed Drug Register [167], the National Diabetes Register (NDR) [168]and the regional Quality Registry for chronic diseases (QregPV) [169].

Data material in Paper IV

The data in this study include variables for each primary care centre (PCC) for the period April 2011 – January 2014. Table 7 illustrates the independent and Table 8 the dependent variables in Paper IV.

Table 7. Independent variables for each PCC in Paper IV

Variable description	**Scale**	**Data Cycle**	Complete-ness rate
Ownership type of the primary care centre	Privately owned / publicly owned	Unaltered	100%
Geographical location of the PCC	Within or outside the metropolitan area (20km range)	Unaltered	100%
Number of citizens listed	Ratio (0-20,000)	Monthly	100%
Proportion of female and male citizens listed	Percentage	Yearly	100%
Proportional size of the three different age groups (aged below 20, aged 20-64 and aged 65 and above) of citizens listed	Percentage	Yearly	96.6%
Care need index CNI of the listed population	Ratio	Monthly	100%

Table 8. Dependent variables for each PCC in Paper IV

Variable description	**Scale**	**Data Cycle**	**Completen ess rate**
Patient Perceived Quality (sample of the listed population)	Weighted values (0-100)	2011, 2012, 2013	97.4%
Number of purchased prescriptions from a PCC for antibiotic drugs for a 3-month period per 100 individuals listed at the PCC	Ratio (0-30)	Quarterly prescription rate	95.6%
Defined daily doses of prescribed and purchased benzodiazepine derivatives per listed individuals visiting the PCC	Ratio (0-3,000)	Monthly	95.4%
Annual rate of follow-up routines carried out for patients with Diabetes Mellitus	Percentage	2011, 2012, 2013	99.6%
Rate of follow-up routines carried out for patients with Ischemic Heart Disease	Percentage	2012	89.5%
Rate of follow-up routines that carried out for patients of with Hypertension	Percentage	2012	97.1%

Data analysis & statistics in Paper IV

In the cases of missing data, PCCs were excluded from the calculations. All data was analysed using SPSS v22 and SAS v9.3. The demographic characteristics of the two groups (privately and publicly owned PCCs) and their changes over time were analysed by means of descriptive statistical calculations (mean values and standard deviations) of the independent variables.

The analysis carried out was a study of a total population with very high rates of data completeness. This means that no power calculation and/or tests for statistical significance were performed.

Mean values and standard deviations (and in some cases percentiles) of the dependent variables were calculated and in order to investigate for possible confounders a linear mixed model including confidence intervals for repeated yearly observations was implemented. The adjustments are presented in Table 9. For the outcome measures of the chronic diseases no adjustments were conducted as all primary healthcare centres were expected, according to regional guidelines, to carry out basic follow-up measurements as such as documentation of blood pressure and smoking habits regardless age, socioeconomic status, location or size of the centre.

Table 9. Adjustments for the dependent variables

Variable	Adjustment for
Patient Perceived Quality	CNI, number of listed citizens, location of the PCC
Prescription rates of antibiotics	CNI, proportion of gender groups, proportion of age groups and location of the PCC
Prescription rates of benzodiazepine derivatives	CNI, proportion of gender groups and location of the PCC

3.2 Ethical considerations

According to Swedish law governing ethical review of research involving humans, the studies in Papers I to IV did not require ethical approval [170]. The Regional Ethics Committee of Gothenburg was contacted and they approved the study in Paper I without any formal application, as the study did not involve any health information on individual subjects. Before the interviews in the two qualitative studies – Paper II and Paper III - the participants were informed that their participation was voluntary and that they had the right to withdraw at any time without being required to give a reason. Written, informed consent was obtained from all the participants. The study in Paper IV does not involve data on individual patients and according to Swedish law, aggregated data on the level of the primary care centre is public and not liable to any confidentiality.

4 RESULTS

In this chapter, the results of Papers I-IV are first presented in detail and then summarised.

4.1 The effects of the structured patient-sorting system

New routines and workflows

The introduction of the structured patient-sorting system resulted in a standardized booking routine that included a developed manual with guidelines that were inspired by the Manchester Triage System. All patients who came in contact with the Primary Healthcare Centre were assessed by nurses and sorted to the appropriate reception. Figure 12 shows the flow chart of the sorting procedure.

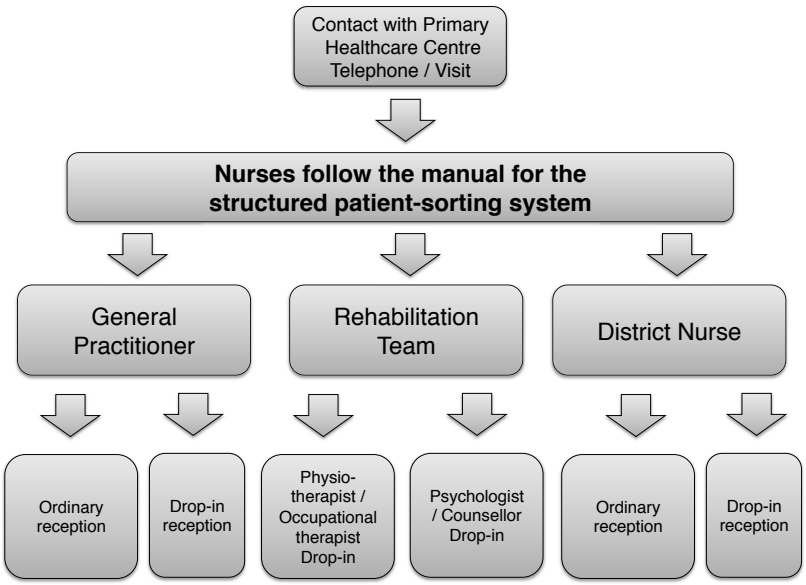


Figure 12. Flowchart of the structured patient-sorting system

4.1.1 Paper I

Improved access rates

Ten months after the introduction of the structured patient-sorting system for the rehabilitation team and 6 months after its introduction for GPs and district nurses the access rate per staff member increased by an average of 13% compared with the corresponding periods the year before. The total increase of the Primary Care Centre's access rate under the same periods was reinforced by two additional GPs leading to an increase of 27% in accessibility. The group of professionals with a generally lower number of visits, the rehabilitation team, increased their access rates dramatically (>50% increase), in particular occupational therapists, psychologists and physiotherapists. Counsellors and district nurses increased their access rates moderately. GPs who had comparatively the highest number of visits per professional decreased their access rate under the studied period by 11%. This result shows therefore two tendencies that occur at the same time: 1) an increase in the productivity of the rehabilitation team and 2) a shift in patient visits from GPs to the rehabilitation team. Table 10 and Figure 13 illustrate the changes in the access rates.

Table 10. Number of monthly visits per professional before and after the introduction of the patient-sorting system.

	General Practitioner*	District Nurse	Psycholo-gist	Counsellor	Physio-therapist	Occupational therapist
Before	360.3	130.0	38.0	41.2	52.4	20.5
After	321.9	138.0	59.9	49.4	80.5	33.0
Change	-11%	6%	57%	20%	54%	61%

**The number of visits per GP appears higher than in reality due to the fact that junior doctors under training who were present at the PCC at a constant rate during the period studied were not counted as GPs.*

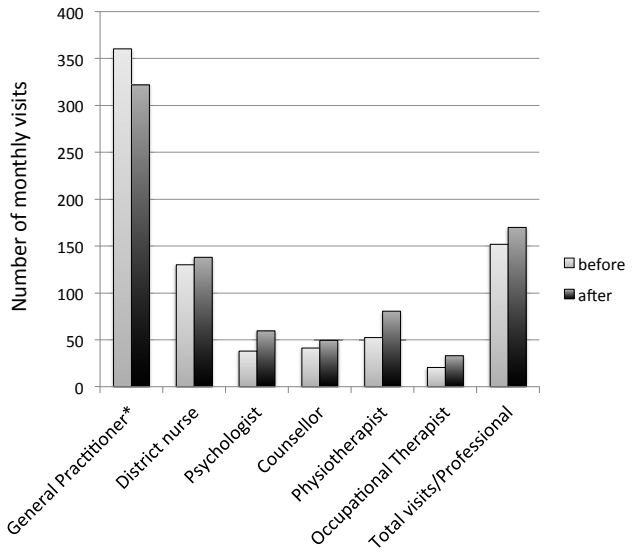


*Figure 13. Number of monthly visits per professional before and after the introduction of the patient-sorting system. *see commentary Table 10*

The rehabilitation team had direct access to a GP for inter-professional consultation if demanded. The majority of patients initially treated by the rehabilitation team were treated by the team solely (83%) and did not need to see a GP. No adverse events due to this procedure were reported.

Perceived accessibility and work situation

Some patients and some staff members were initially sceptical, especially to how to handle patients who wished to see a GP irrespective of their condition. However the results of short questionnaires revealed that the absolute majority of patients and staff members were satisfied with the new situation after the introduction. Six months after the introduction 47% of the participating patients (n=476, response rate 63%) perceived an improvement in accessibility and after ten months 96% of the participating patients (n=94, randomly selected) perceived a good or very good situation concerning accessibility. 75% of staff members (n=36, response rate 75%) perceived after six months an improvement of their working situation and an improvement in the possibility to book a patient appointment. 92% of them perceived the new working situation as good or very good.

Appropriate sorting and treatment

GPs were initially concerned about the risk of wrongly sorted patients with conditions inappropriate for the GP drop-in reception such as chronic pain or complex conditions with several symptoms. However the registration of all diagnoses at the GP drop-in reception showed that the absolute majority of patients had appropriate conditions. The concern that a GP drop-in reception with a high flow of patients with infections would lead to an irrationally high use of antibiotics could not be confirmed through Kinolone rates that were lower than regional and national rates. However the use of Tetracycline was higher than regional and national rates, which can be only partly be explained by the high prevalence of COPD in the patient population.

4.1.2 Paper II

Staff members' conceptions of the patient-sorting system

Although the increased productivity and the higher percentage of satisfied patients indicated a greater workload for most of the staff members, the results of the short questionnaires showed high satisfaction rates and perceived improvements among the employees. These results were also confirmed through the bi-annual employee survey of the primary care organization to which the Primary Care Centre belonged: after the intervention the results of this particular centre showed the greatest improvements of all 25 centres [171].

The results of the qualitative study with the phenomenographic approach revealed how these findings can be explained:

The staff members conceived the structured patient-sorting system as an appropriate platform for promoting transformation into an effective patient-centred primary healthcare team. They perceived organizational development as a continuous participative process that demanded the commitment of all team members. Through this approach several change processes were handled concurrently: the improvement of healthcare processes, the empowerment of professionals and team development. Figure 14 illustrates the connections between change processes that were of a practical nature and therefore visible and easier to quantify, and of change processes that were subtle and therefore easier to grasp through interviews.

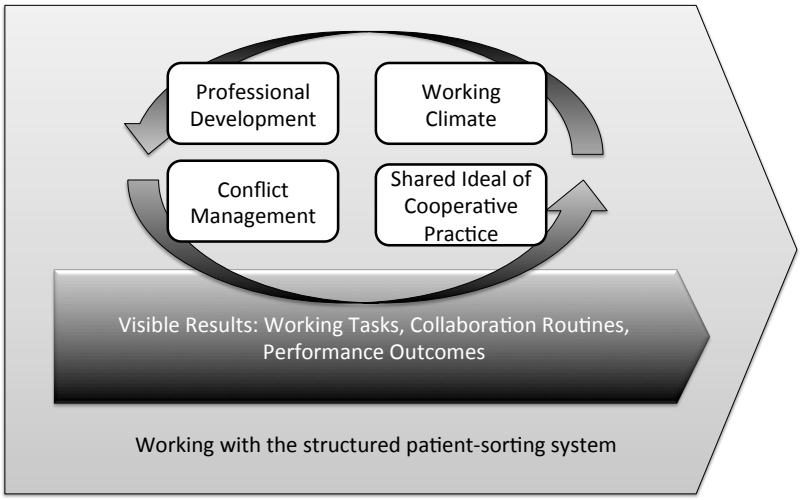


Figure 14. Connections between visible and subtle changes

Staff members had three qualitatively different ways of understanding the phenomenon: a rather technical understanding, an understanding of identity on an individual but also on a group level, and an understanding of interdependency and the complex dynamics of the system which are reflected by the following categories of description:

The structured patient-sorting system was perceived as a framework for the development of improved, clear and consistent patient-centred processes.

A demand to decrease inequalities in the booking process and to make a better use of competences and resources was identified. Staff members had to negotiate in a participative process on operative routines in the sorting and treatment process, which led finally to a manual with guidelines, which improved patient safety through the reduction of unmotivated variation. The participants described comprehensive achievements in patient-centred processes leading to improved efficiency and service after the implementation of the new system. Efficiency was mainly improved through the increased use of physiotherapists, psychologists and occupational therapists, who started to make appointments for patients without referrals from GPs. In some cases it had been difficult to convince members of the

advantages of the new system. The new system was not seen as a static set of routines but more as an appropriate framework for its users and the continuous development of the healthcare centre's processes.

"If you look from a patient perspective this has of course led to better care. The patient will get faster to the proper caregiver... The greatest benefit is that patients get help faster. Actually the right help."

"We are different professionals, and therefore it's very important that you have to update each other constantly otherwise it may drift away. ... So it is in a state of constant development."

"The innovation meetings were good ... everybody understands what is going on and everyone plays a part in it ... that's probably the most important aspect. And that all of us are equally important, otherwise it will not work."

The structured patient-sorting system was visualized as being a promoter of professional development and a shared ideal of cooperative practice.

Nurses expressed the view that the new system to assess and sort the patient to the appropriate professional required more competences than the old system. They were willing to acquire this knowledge, got more confident. Physiotherapists, psychologists and occupational therapists described similar experiences in relation to their expanded responsibilities when they started treating patients without referral from a general practitioner. These team members perceived this professional development as a positive challenge. These shifts of responsibility initiated a positively perceived intensification of inter-professional communication, collaboration and mutual feedback on patient cases. During these discussions team members became aware of differences in their approaches and the existing competences of other team members. They eventually mentally visualized a shared ideal of cooperative practice and appreciation of the resulting collegial relationships. The creation of value for the patient was perceived as being a task for the whole team.

"If I am unsure of something, I can just go and knock on somebody's door, which I might not have done otherwise."

"You experience more fellowship because everyone works towards the same goal: we have our patient in focus... This makes you see the big picture and feel that we'll fix everything together."

The structured patient-sorting system was envisaged as being a common denominator and catalyst in conflict management.

While some staff members had previously operated almost independently from the rest of the healthcare centre, suddenly all staff members were expected to become part of the larger team, which was a cause for conflicts. During the implementation of the structured patient-sorting system these latent conflicts became of necessity visible and led to open confrontations. On a regular basis the whole team met in forums for conflict management where they discussed how the patient-sorting system was currently working and whether or not the need existed to adapt or develop it further. At these meetings confronting views could be expressed aloud and the team tried to solve the conflicts through direct communication. Team members expressed a positive attitude towards these meetings, even if perceived as demanding and time-consuming. They endorsed the opportunity to solve the conflicts through communication. Some staff members disliked the changes for different reasons like impending retirement or reluctance to collaborate with other team members. The new system was therefore perceived as a catalyst in a selection process: the majority of staff members experienced an active ownership of the structured patient-sorting system and felt encouraged while a few staff members disliked the changes and eventually decided to leave the team. Interestingly the participants did not express negative feelings about the loss of these staff member but accept it as a part of the process. The management's leadership and communication played an important role in conflict management. The leadership model was visualized as a balance between openness and sensitivity on the one hand and responsiveness and consistency on the other hand. It was vital for the management to be present at all times in order to mediate and execute minor adaptations and to make sure that all team members complied with the negotiated routines.

"These conflicts existed, of course, also before - that one felt that a patient has been booked incorrectly. But now there was a platform to discuss it. [...] So earlier it was like talking that did not lead to a change, but now it is like: 'Ok, next time when such a patient comes we are going to handle it in that way...' "

"I know there are many who find it tough to go to meetings and talk about everything. The downside is that it takes a lot of time but it is always like this - there's no system that's totally perfect. ... You need not be concerned that conflict is always negative. There will be always conflicts when you have people discussing issues with each other. You should try to see the positive side of the conflict instead. ... And it's a very democratic system that we have

here where all issues must be raised and discussed. Yes, I think it's good actually."

"I do not think there was much resistance, but it was harder to introduce an open reception for one group who had previously organized their reception entirely by themselves. Those who did not agree with the change quit, and so it was like a small self-regulation, which was pretty good - which was needed here."

Due to the fact that the interviews were conducted one and two years after the introduction, the change process itself was also observed. Even if the general concepts remained stable during this time, nuances in the conceptions of the different professionals could be noted. Table 11 illustrates different aspects of the change processes that took place concurrently during the two years. While physiotherapists and psychologists mainly appreciated the new responsibilities, nurses emphasized more on patient safety though the guidelines. GPs highlighted the vulnerability of the system if maintenance was neglected.

Table 11. The change process during and after the introduction of the structured patient-sorting system.

Before	Change Process	After 1 year	After 2 years
work climate and leadership problems: dysfunctional, avoidant, detached	new leaders, work climate improved	positive climate and leadership: open, communicative, responsive, including, consistent	still positive
			some promises from leaders not fulfilled: training, recruitment
communication problems	communication between members begins, conflicts become visible and are being processed	more knowledge about each other and others' competences	
collaboration problems	involvement of all team members	better collaboration in patient cases	
motivation problems: idle	participatory development of new routines.	regular meetings: platform for conflict-solving	meetings became slightly less effective
efficiency problems	ownership of change process encourages	all: more satisfied patients through greater efficiency in both waiting time and collaboration physiotherapists: early involvement/treatment leads to better outcome physiotherapists, psychologists,(nurses): more responsibility seen as a challenge, pride nurses: perceived safety (manual with agreed guidelines) doctors and nurses: drop-in effective and interesting, but risky when sorting fails	
	those who dislike the change drop out, new ones come in		
recruitment problems: lack of doctors		recruitment problems remain: lack of doctors	

4.2 The effects of the healthcare reform

4.2.1 Paper III

Managers' perception of the transition

This analysis revealed three categories of which the first two show a clear differentiation into positive and negative experiences. The local preconditions (e.g. number of competitors) and the managers' change management and financial skills influenced the perceptions.

Financial incentives as the major driving force

The managers' experiences with the predominant economic questions were ambiguous. Financial incentives were perceived as positive when they moved the centre to towards effectiveness in processes, time management and costs; when assignment, tasks and organisational structure became clearer; when employees became more result-oriented; and when it became easier to follow up and compare financial results.

"The greatest effect is that you need to be extremely focused on the financial side. This is the biggest change although I also need to demonstrate more clearly to employees what we are supposed to do and not do. You focus more on making sure you perform the tasks you are paid for – that's the way we survive."

"You have full transparency on the financial side. You have control of the figures; you see where every penny is going. /.../ Then you know exactly what action you need to take to get your business working."

Financial incentives were perceived as negative when managers had difficulties to foresee the future financial position or to achieve a financial balance. Managers generally experienced uncertainties in the rules as stressful, found it extremely difficult and stressful to deal with the situation when they were forced to reduce the number of staff for financial reasons. They expressed disappointment as they expected to have more freedom to develop their primary healthcare centres based on their own ideas but felt that the opposite was the case. They experienced an increase in the administrative workload and stated that research was not a priority, although there was the possibility of applying for research funds.

"What I can say in the current situation is that the staffing level is so minimal that we can't cut back anymore. Our financial managers keep saying: 'You

have to cut back on staff. Even though we know they are working themselves into the ground.' It's impossible."

"All these bureaucratic tasks exhaust me. It really eats up a lot of my time. I think all the managers feel the same way."

"You thought you would have more freedom but it became narrower instead."

"We don't have very much time for research unfortunately."

Depending on the local situation managers perceived the new competitors that had become established in their district as completely different. Managers in deprived areas, where the number of primary healthcare centres and accessibility were previously low, welcomed new competitors, while managers in central districts, which was where the majority of new, privately owned centres had opened, considered it stressful and difficult to handle a new situation with noticeable competition.

"The task assigned to us was too large. It was impossible to have a district of 23,000 [inhabitants] /.../ We couldn't manage. So it was great that a competitor came into this very deprived area /.../ It was good for us."

"I was concerned because we were exposed to incredible competition here in the [city] centre. /... /I was worried about how we would balance our finances and that many [employees] would need to be fired."

The subcategories of this first category are summarized in Table 12.

Table 12. Financial incentives as the major driving force

Category 1: Financial incentives as the major driving force	
Perception	Subcategories
Positive experiences	- Move towards effectiveness in processes, time management and costs - Assignment, tasks and organisational structure became clearer - Employees became more result-oriented - Easier to follow up and compare financial results
Negative experiences	- Difficult to foresee the future financial position - Difficult to achieve a financial balance - Increased administrative workload - Strict rules lead to less freedom to develop your own ideas - Stressful if rules are unclear - Reducing the number of staff is stressful - Own research activities neglected
Positive and negative experiences	- New competitors - Extensive changes took place promptly

Shift of power from the healthcare provider to the 'customer'

Patients acquired a great deal of power by having the opportunity to choose their favourite primary healthcare centre. Managers thus prioritized drop-in receptions and noticed positive change through improved accessibility and a more welcoming, friendly and communicative attitude to patients.

"We never had a drop-in reception before and now we have it every day between 9 and 3. We have a much better access rate than before."

Concurrently the increasing number of patients with unreasonable demands frustrated them.

"I find that patients have become so demanding: I've read this..., I found this on the internet..., I want this examination..., I want to see the doctor immediately..."

They expressed concern about the increasing usage of resources for mostly healthier individuals at the cost of less-empowered patients with more extensive needs, mostly multi-morbid patients.

"We need to devote so many resources to these drop-in receptions. I feel we see a lot of patients who don't really need to come to us."

"A chronically ill [patient] gets to meet a doctor for two or three minutes. This is really the wrong forum. Many patients are dissatisfied with the visit and need to return./.../The patient is given too much power to control something that actually leads to worse care."

The subcategories of this second category are summarized in Table 13.

Table 13. Shift of power from the healthcare provider to the 'customer'

Category 2: Shift of power from the healthcare provider to the 'customer'	
Perception	Subcategories
Positive experiences	- Access to PHCCs became easier and faster through drop-in receptions - More welcoming, friendly and communicative attitude to patients
Negative experiences	- Unreasonable, demanding patients - Reduction in the number of planned visits for chronically ill patients in favour of time devoted to minor complaints - Loss of home visits
Positive and negative experiences	- The shift of power is leading to prioritization conflicts

Shortcomings in change management skills

All managers were offered external support in change management through a company contracted by the board of directors. The majority of the managers collaborated with the external consultants and stated that it was mainly the consultants who led the change management process. Some managers also expressed a need for more support and consultation due to shortcomings in their change management skills. Only a few managers could name change management strategies and the majority of the managers were not able to describe their concepts more detailed.

"We try and take small steps forward but as I see it we have no structured system to develop the organisation..."

"I thought many times that it was a really tough year and I wished I had been given a bit more training."

The subcategories of this second category are summarized in Table 14.

Table 14. Shortcomings in change management skills

Category 3: Shortcomings in change management skills	
Perception	Sub-categories
Negative experiences	- Lack of concepts and strategies. Although managers received support some felt a need for more support due to shortcomings in their change management skills. - Managers lack training in the administrative and financial skills required following the transition. - Managers have difficulty remaining updated on changes in regulations. - Managers feel mental pressure due to changes that needed to be carried out swiftly, including reducing or transferring staff

Additionally the managers were asked if they had perceived that the training of student nurses, medicals students or junior doctors had been affected by the transition in the system. None of the managers perceived that the training had been affected either positively or negatively by the change in the system.

Core themes in Paper III

The analysis revealed two core themes:

The transition is perceived as a rapid change, enforced mainly through financial incentives.

The transition of the system made financial issues to the managers' main task with effects that were considered to be both positive and negative depending on the preconditions, such as the number of local competitors and the managers' change management and financial skills. The general consensus was that the changes took place rapidly.

Prioritisation conflicts arise between patient groups with different needs, demands and levels of empowerment.

With the shift in power towards the patient, a new conflict emerged: the difficulty to prioritising correctly among patient groups with differing needs, demands and levels of empowerment. Managers were concerned about the negative shift in resource usage towards mostly healthier individuals. They were finding it difficult to provide adequate follow-up for less empowered patients with more extensive needs, mostly multi-morbid patients.

4.2.2 Paper IV

Differences between privately and publicly owned primary healthcare centres

After some fluctuations in the number of primary healthcare centres in connection with the introduction of the healthcare reform in October 2009, the number of primary care centres remained relatively stable from 2011 to 2014. However the number of listed patients revealed that there was a continuous shift of patients from publicly owned centres to privately owned centres (Figure 15).

The listed population at privately owned centres grew by 70,181 citizens and the listed population at publicly owned centres decreased by 42,866 citizens, while the population in Region Västra Götaland grew by 24,480 citizens.

Differences in characteristics of the listed populations

While there were only only minimal differences between privately and publicly owned primary care centres concerning gender division of the listed citizens, the groups differed in the composition of their populations concerning age and socioeconomic index (Table 15). While the group of citizens of working age (aged 20-64) was steadily overrepresented at privately owned PCCs, the groups of citizens aged 0-19 and over 64 showed a small but steady overrepresentation at publicly owned PCCs. Concerning the socioeconomic index CNI, the mean CNIs of the two groups of PCCs showed a fairly steady balance, but the group of privately owned PCCs had a higher variance in CNI due to a higher degree of segregation in their populations. Figure 17 illustrates a comparison that also considered the different sizes of the PCCs showing that the fraction of citizens representing the second most affluent quintile was overrepresented at privately owned PCCs at the cost of an underrepresentation of the fraction representing the second least affluent quintile

Table 15 Demographic characteristics of privately and publicly owned primary care centres (PCC)

Sample sizes, location and listed population with age, gender och socioeconomic characteristics. Results of the National Survey on Patient Perceived Quality (PPQ). Unless otherwise stated standard deviations in brackets.

	Privately owned PCC			**Publicly owned PCC**			**all PCC**		
	no. of PHCC	**no. of listed citizens, (% of the pop.)**	**mean listed citizens/PHCC**	**no. of PHCC**	**no. of listed citizens, (% of the pop.)**	**mean listed citizens/PHCC**	**no. of PHCC**	**no. of listed citizens, (% of the pop.)**	**mean listed citizens/PHCC**
April 2011	86	510123 (32.1%)	5931.7 (3426.29)	114	1075225 (67.6%)	9431.8 (3931.52)	200	1585348 (99.7%)	7926.7 (4099.90)
January 2014	87	580304 (35.9%)	6670.2 (3495.72)	114	1032359 (63.9%)	9055.8 (3768,60)	201	1612663 (99.9%)	8023.2 (3830.67)
change,(GR)	+1 (+1.1%)	+70181 (+12.1%)	+738.5 (+11,1%)	0 (0)	-42866 (-4.2%)	-375 (-4.2%)	+1 (+0.5%)	+27315 (+1.7%)	96.5 (+1.2%)
	geographic location: within or outside the regional metropolis, percentage of PCCs within their group								
	within	**outside**		**within**	**outside**		**within**	**outside**	
	56.9%	43.1%		34.5%	65.5%		44.0%	56.0%	
	gender in percentage of listed citizens								
	female	**male**		**female**	**male**		**female**	**male**	
April 2011	49.61% (0.035)	50.39% (0.035)		49.83% (0.018)	50.17% (0.018)		49.72% (0.027)	50.28% (0.027)	
January 2014	49.55% (0.036)	50.45% (0.036)		49.78% (0.018)	50.22% (0.018)		49.68% (0.027)	50.32% (0.027)	
	fraction of citizens within each group belonging to age groups (aged 0-19, 20-64, >64)								
	0-19	**20-64**	**>64**	**0-19**	**20-64**	**>64**	**0-19**	**20-64**	**>64**
April 2011	20.1% (0.06)	62.4% (0.08)	17.5% (0.06)	23.4% (0.04)	56.2% (0.05)	20.4% (0.05)	21.9% (0.06)	58.9% (0.08)	19.2% (0.06)
January 2014	20.0% (0.06)	62.4% (0.08)	17.6% (0.06)	23.4% (0.04)	56.0% (0.05)	20.6% (0.05)	21.9% (0.06)	58.8% (0.07)	19.3% (0.06)
	mean of Care Need Index								
April 2011	2.36 (0.912)			2.32 (0.632)			2.34 (0.762)		
January 2014	2.36 (1.034)			2.30 (0.667)			2.33 (0.844)		
	fraction of citizens within each group listed at PCC belonging to quintile 1-5 of Care Need Index (1=most affluent, 5=least affluent)								
	CNI Q1	**CNI Q2**	**CNI Q3**	**CNI Q4**	**CNI Q5**	**CNI Q1**	**CNI Q2**	**CNI Q3**	**CNI Q4**	**CNI Q5**	**CNI Q1**	**CNI Q2**	**CNI Q3**	**CNI Q4**	**CNI Q5**
	21%	26%	18%	12%	22%	21%	14%	19%	25%	22%	21%	18%	19%	21%	22%
	Patient Perceived Quality (PPQ) (min 0- max 100 points)														
	PPQ dataset completeness 99,11%					**PPQ dataset completeness 96,25%**					**PPQ dataset completeness 97,40%**				
	mean PPQ	**recommend PCC**	**access**	**continuity**		**mean PPQ**	**recommend PCC**	**access**	**continuity**		**mean PPQ**	**recommend PCC**	**access**	**continuity**	
2011	82.4 (6.21)	86.3 (7.93)	84.7 (9.59)	70,4 (14.39)		79.6 (5.62)	81.7 (7.85)	80.18 (9.45)	58.2 (13.86)		80.8 (6.01)	83.6 (8.18)	82.1 (9.75)	63.2 (15.27)	
2012	81.5 (6.35)	85.1 (9.03)	82.2 (10.47)	68.9 (14.14)		78.4 (5.63)	79.5 (8.34)	78.4 (9.47)	57.6 (14.01)		79.7 (6.12)	81.9 (9.04)	80.0 (10.05)	62.4 (15.11)	
2013	81.4 (6.23)	84.7 (8.66)	78 (11.81)	68.1 (12.96)		77.9 (6.77)	79.0 (9.84)	77.5 (10.24)	57.1 (15.13)		79.4 (6.75)	81.4 (9.75)	77.9 (10.91)	61.8 (15.22)	

PCC = primary care centre no. = number, pop.= population, GR = growth rate, PPQ = Patient Perceived Quality, yo=years old, CNI Q1-5 = Care Need Index quintile 1-5

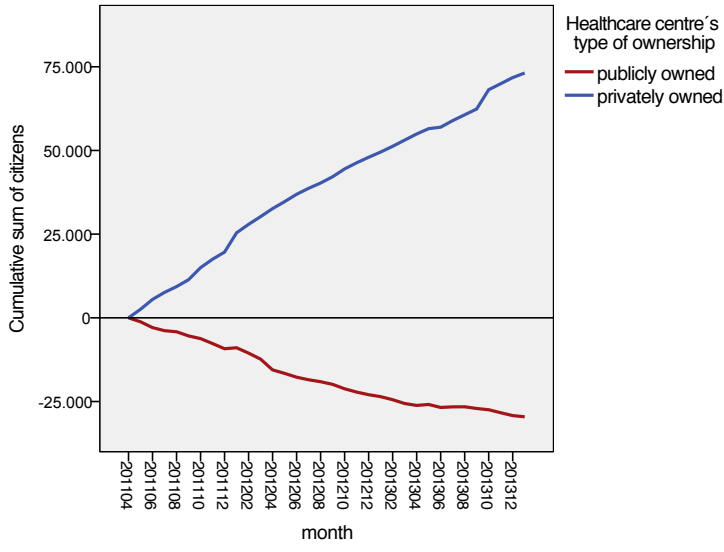


Figure 15. Cumulative number of citizens listed or signed off

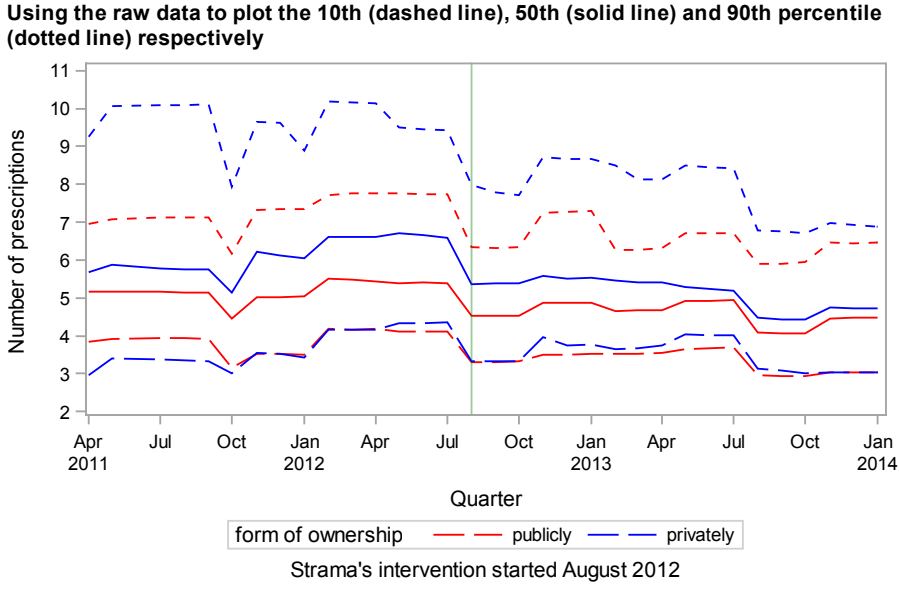


Figure 16. Number of purchased prescriptions of antibiotics for a 3-month period per 100 listed citizens. The green line indicates the launch of Stramas intervention.

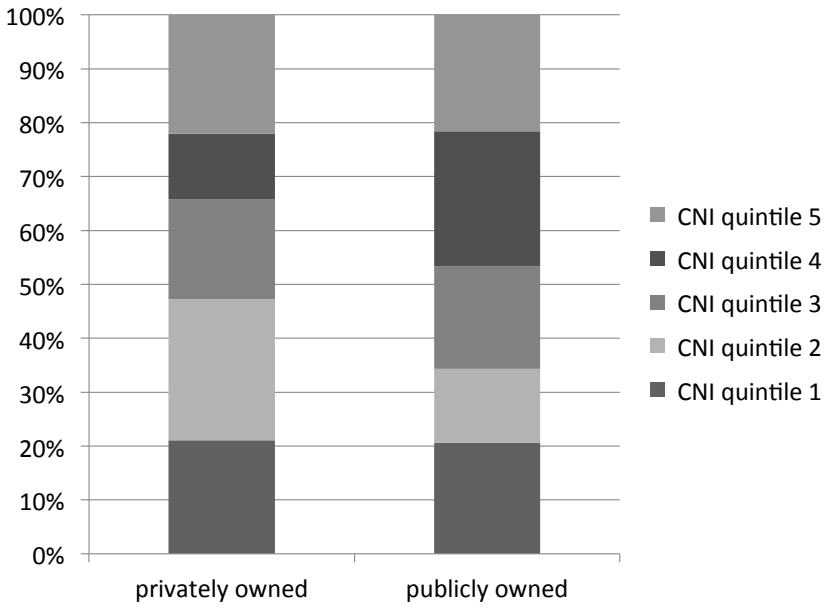


Figure 17. Fractions of populations representing the different socioeconomic quintiles (CNI quintile 1=most affluent, CNI quintile 5=least affluent)

Differences in patient perceived quality

The results of the national survey of patient perceived quality showed that privately owned PCCs received higher ratings for levels of satisfaction than publicly owned PCCs, (mean weighted value 82.4 compared to 79.6), especially in the item perceived continuity (70.4 compared to 58.2) and the item reflecting whether the patient would recommend the centre to others (86.3 compared to 81.7) (Table 15). This was also the case even when adjusted for mean CNI, geographic location and the size of the PCC (Table 17). Populations that were less affluent and populations outside the regional metropolis tended towards a lower rating of patient perceived quality. In 2012 and 2013 the values decreased slightly in both groups maintaining the order between the two groups.

Differences in antibiotic use

The mean rate of privately owned PCCs (6.0 purchased prescriptions for a 3-month period/100 listed citizens) was steadily higher than the mean rate of publicly owned PCCs (5.1 purchased prescriptions for a 3-month period/100 listed citizens) (Figure 16), even when adjusted for mean CNI, gender, age

structure and geographic location of the PCC (Table 17). Privately owned PCCs also showed a larger variance in antibiotic use (standard deviation 2.78 compared to 1.50). While the 10th percentile of each group had rates that were similar, differences increased in the comparison of the 50th and even more in the comparison the 90th percentiles. Differences between the groups were largest in 2011 and decreased over time especially for the 90th percentile after August 2012 when an intervention started that supported the rational use of antibiotics (Figure 16). The recurring periodical changes depend on different seasonal prevalence of the treated infections.

Differences in the use of benzodiazepine derivatives

The group of publicly owned centres showed a steadily higher mean of the prescription rates (Table 16) even when adjusted for mean CNI, gender and the geographic location of the PCC (Table 17). However, the 95% confidence interval reveals substantial variance. In contrast to use of antibiotics the rates for all PCCs increased further under the studied period by 3.6% for younger individuals (aged 20-74) and by 7.4% for elderly individuals (aged over 74). The prescription rates of benzodiazepine derivatives for the elderly were in general more than fivefold higher than those for younger patients. The greatest increase (11%) was noted for the group of elderly who were listed at privately owned PCCs. Differences diminished over time due to the fact that the group of privately owned PCCs increased their prescription rates from 2011 to 2013 more than twice as much as publicly owned centres. Prescription rates for younger patients tended to be higher outside the regional metropolis, while the rates for older patients showed the reverse results.

Table 16. Prescription of benzodiazepine derivatives

Purchased prescriptions in defined daily doses (DDD) per 100 listed individuals at PCC, divided into age-group, year and type of ownership.

		for individuals aged between 20-74				**for individuals >74 years of age**			
year	type of owner-ship	mean DDD	Standard Deviation	increase-rate compared to 2011	deviation from mean DDD for all PCCs	mean DDD	Standard Deviation	increase-rate compared to 2011	deviation from mean DDD for all PCCs
2011	publicly	299,20	103,04		4,83%	1751,85	445,74		2,70%
	privately	266,64	162,59		-6,58%	1643,16	740,16		-3,68%
	all PCCs	285,42	132,49			1705,88	590,77		
2012	publicly	309,19	105,49	3,34%	3,91%	1775,69	440,47	1,36%	1,23%
	privately	281,73	151,34	5,66%	-5,32%	1724,35	578,87	4,94%	-1,70%
	all PCCs	297,55	127,65	4,25%		1754,10	503,86	2,83%	
2013	publicly	306,22	101,55	2,35%	3,55%	1833,08	433,27	4,64%	0,03%
	privately	281,83	144,04	5,70%	-4,70%	1831,66	567,52	11,47%	-0,04%
	all PCCs	295,74	122,21	3,61%		1832,47	494,94	7,42%	
Total	publicly	305,56	103,46		4,00%	1790,97	440,33		1,12%
	privately	277,98	151,66		-5,39%	1744,23	623,95		-1,52%
	all PCCs	293,81	126,98			1771,17	526,45		

Table 17. Adjustments for Care Need Index, gender, age structure, size and location of primary care centres

The estimates of the mean patient-perceived quality, prescription rates of antibiotics and benzodiazepine derivates per ownership type are calculated by a linear mixed model for repeated yearly observations (for the 197 PCC's with data during 2011-2013). Adjustments were made selectively for year, location, number of listed citizens (in 100), Care Need Index, proportion of gender group listed and proportion of age groups listed at PCC (0-19 years, 20-64 years and 65+).

Patient-perceived Quality (mean)

Effect	Estimate	Standard Error	95 % confidence interval	
			Lower	Upper
Intercept	92,17	1,505	89,20	95,14
Publicly owned	-2,24	0,858	-3,93	-0,56
Privately owned	0			
Year, 2011	1,10	0,568	-0,02	2,22
Year, 2012	0,16	0,558	-0,94	1,26
Year, 2013	0			
Publicly owned * year, 2011	0,69	0,738	-0,76	2,14
Publicly owned * year, 2012	0,44	0,730	-0,99	1,88
Publicly owned * year, 2013	0			
Privately owned * year, 2011	0			
Privately owned * year, 2012	0			
Privately owned * year, 2013	0			
CNI	-3,48	0,465	-4,40	-2,57
within regional metropolis	-1,78	0,732	-3,23	-0,34
outside regional metropolis	0			
number of listed citizens (in 100)	-0,03	0,010	-0,05	-0,01

Prescription rates of antibiotics

Effect	Estimate	Standard Error	95 % confidence interval	
			Lower	Upper
Intercept	5,89	2.426	1,13	10,66
Publicly owned	-1,3	0.271	-1,83	-0,77
Privately owned	0			
Year, 2011	0,89	0.287	0,33	1,46
Year, 2012	0,89	0.280	0,34	1,44
Year, 2013	0			
Publicly owned * year, 2011	-0,49	0.374	-1,23	0,24
Publicly owned * year, 2012	-0,43	0.368	-1,15	0,3
Publicly owned * year, 2013	0			
Privately owned * year, 2011	0			
Privately owned * year, 2012	0			
Privately owned * year, 2013	0			
CNI	0,57	0.109	0,36	0,78
Proportion female	3,8	3.555	-3,18	10,78
Proportion male	0			
Proportion of 0-19	0,95	1.877	-2,73	4,64
Proportion of 20-64	-5,19	1.811	-8,74	-1,63
Proportion of 65+	0			
within regional metropolis	-0,8	0.183	-1,15	-0,44
outside regional metropolis	0			

Prescription rates of benzodiazepine derivates for patients aged 20-74

Effect	Estimate	Standard Error	95 % confidence interval	
			Lower	Upper
Intercept	-149,95	119.807	-385,27	85,36
Publicly owned	12,79	17.732	-22,03	47,62
Privately owned	0			
Year, 2011	-12,49	19.367	-50,53	25,55
Year, 2012	-5,42	18.869	-42,48	31,64
Year, 2013	0			
Publicly owned * year, 2011	4,4	25.219	-45,14	53,93
Publicly owned * year, 2012	3,94	24.819	-44,8	52,69
Publicly owned * year, 2013	0			
Privately owned * year, 2011	0			
Privately owned * year, 2012	0			
Privately owned * year, 2013	0			
CNI	22,01	6.986	8,29	35,73
Proportion female	821,64	234.167	361,7	1281,58
Proportion male	0			
within regional metropolis	-50,99	10.714	-72,03	-29,95
outside regional metropolis	0			

Prescription rates of benzodiazepine derivates for patients aged over 74

Effect	Estimate	Standard Error	95 % confidence interval	
			Lower	Upper
Intercept	602,43	450.151	-281,74	1486,59
Publicly owned	50,98	66.624	-79,88	181,84
Privately owned	0			
Year, 2011	-201,67	72.766	-344,59	-58,75
Year, 2012	-135,76	70.896	-275	3,49
Year, 2013	0			
Publicly owned * year, 2011	134,16	94.756	-51,96	320,27
Publicly owned * year, 2012	76,66	93.253	-106,5	259,82
Publicly owned * year, 2013	0			
Privately owned * year, 2011	0			
Privately owned * year, 2012	0			
Privately owned * year, 2013	0			
CNI	119,38	26.248	67,83	170,94
Proportion female	1637,02	879.835	-91,1	3365,14
Proportion male	0			
within regional metropolis	212,03	40.256	132,96	291,1
outside regional metropolis	0			

In order to investigate for possible confounders a linear mixed model including confidence intervals for repeated yearly observations was implemented. This mixed model can be split into two components: a "random" effect and a "fixed" effect. The random effect is that primary healthcare centres have a random intercept (starting point) in their variables. In this way individual variation between the centres was considered. The fixed effect is manifested in all other parameters: type of ownership, geographical location, year etc. The residuals of this model (based on annual data) show only small tendencies to skewness (Figure 18), which is why the research group assessed this model as being viable in this study.

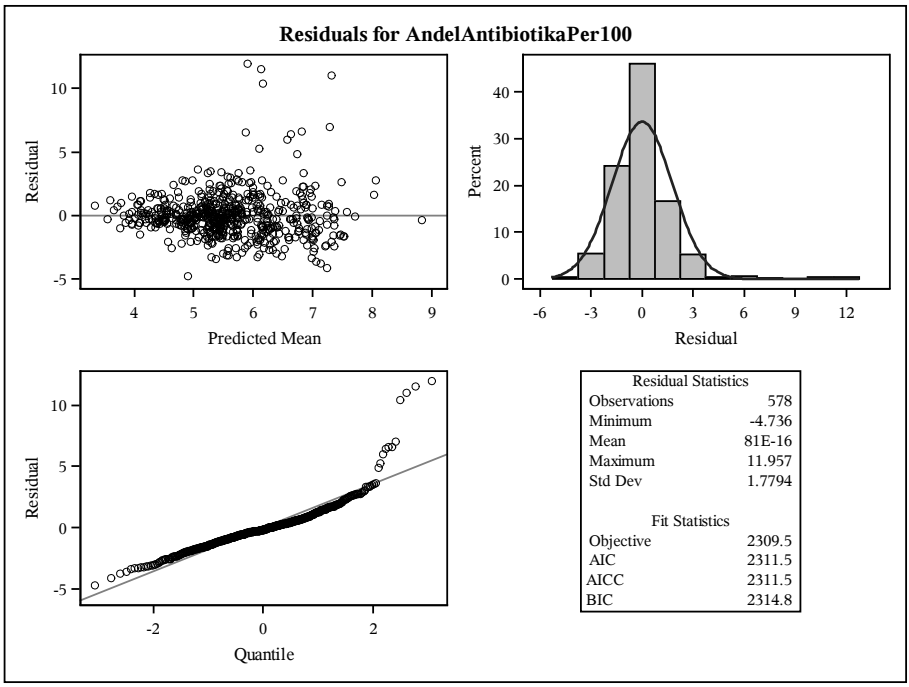


Figure 18. Residuals of the mixed model used for the number of antibiotic prescriptions

Differences in the follow-ups carried out for patients with certain chronic diseases

The differences between the two groups were relatively small: publicly owned PCCs showed slightly higher follow-up rates with less variation for all three chronic diseases (Table 18). All documentation rates for patients with Diabetes mellitus regardless of ownership type showed improvements over time. The percentages of measurements of patients' blood pressure levels for all three chronic diseases were generally high in both groups (between 82.5-94.5%). While the documentation rate of smoking habits for patients with Diabetes mellitus was high (84.9-89.7%) the same rate was relatively low for patients with ischemic heart disease and hypertension (50.8-59.1%).

Table 18. Percentage of documented follow-up carried out for certain chronic diseases

chronic disease	patients with documentation for	year	Privately owned PCC			Publicly owned PCC		
			percentage mean	SD	percentage data completeness	percentage mean	SD	percentage data completeness
Diabetes mellitus (DM)	HbA1c measurement	2011	**91.1**	8.53	98.8	**90.8**	8.06	100.0
		2012	**92.9**	7.63	100.0	**92.5**	5.20	100.0
		2013	**94.5**	5.40	98.8	**94.2**	5.78	100.0
	blood pressure	2011	**90.7**	7.99	98.8	**90.2**	7.80	100.0
		2012	**92.9**	8.09	100.0	**92.9**	4.26	100.0
		2013	**93.6**	7.19	98.8	**94.5**	4.17	100.0
	body mass index	2011	**82.9**	12.96	98.8	**84.4**	9.96	100.0
		2012	**92.9**	12.01	100.0	**87.3**	7.68	100.0
		2013	**93.6**	9.07	98.8	**89.8**	6.79	100.0
	smoking status	2011	**84.9**	12.64	98.8	**85.4**	10.73	100.0
		2012	**89.1**	11.39	100.0	**87.9**	8.79	100.0
		2013	**88.9**	9.46	98.8	**89.7**	8.97	100.0
	microalbumin urine test	2011	**59.4**	24.54	98.8	**74.2**	17.73	100.0
		2012	**68.4**	22.49	100.0	**75.6**	17.28	100.0
		2013	**70.6**	19.3	98.8	**76.7**	16.46	100.0
	low-density lipoprotein	2011	**67.9**	16.75	98.8	**71.4**	14.49	100.0
		2012	**71.6**	17.36	100.0	**74.9**	13.67	100.0
		2013	**76.1**	13.91	98.8	**77.0**	12.89	100.0
	average percentage		**83.4**	12.60	99.2	**85.0**	10.04	100.0
Ischemic heart disease (IHD)	blood pressure	2012	**82.5**	8.27	89.7	**84.1**	6.23	99.1
	smoking status	2012	**53.0**	17.52	78.9	**59.1**	14.06	98.2
	low-density lipoprotein	2012	**55.3**	16.20	71.6	**60.5**	12.94	99.1
	average percentage		**63.6**	14.00	80.1	**67.9**	11.08	98.8
Hypertension (absence of DM and IHD)	blood pressure	2012	**82.4**	9.14	96.4	**83.9**	7.45	99.1
	smoking status	2012	**50.8**	21.12	93.8	**57.8**	14.5	99.1
	average percentage		**66.6**	15.13	95.1	**70.9**	10.98	99.1

4.3 Summary of the results

The introduction of the structured patient-sorting system at the Biskopsgården Primary Care Centre resulted in a 13% increase on average in the number of patient visits per team member. In the absolute majority of cases, patients and staff members perceived an improved accessibility and satisfaction with the delivery of services respectively working conditions. All patients seeking were assessed by nurses and, based on the patient's condition, were booked to the appropriate reception using negotiated guidelines. The professionals of the rehabilitation team dramatically increased their productivity (in some cases by more than 50%) and appreciated the novelty of being the initial contact for appropriate selected patients, for the majority of whom they were also the sole treatment providers (83%). Previously overburdened General Practitioners reduced their number of patient visits slightly, freeing more time for complex cases in need for a GP consultation. Patients with minor infections and minor complaints who had formerly been rejected due to the lack of accessibility, were sorted to a drop-in reception streamlined for the efficient delivery of services with adequate quality. (Paper I)

During the development and implementation of the new system several important change processes took place concurrently: the improvement of health service delivery processes with the focus on patient-centredness; the empowerment of team members through professional development and knowledge exchange; and team development through a shared ideal of cooperative practice and a pro-active conflict management. Team members conceived the system as being an appropriate platform for the transformation into an effective patient-centred primary healthcare team in which organizational development was perceived as a continuous participative process demanding the commitment of all team members. (Paper II)

The most recent healthcare reform that aimed to strengthen the role of the patient and to improve performance in terms of access and responsiveness, was perceived by the managers of publicly owned primary care centres in the metropolitan area of Gothenburg as a powerful and rapid change. It was enforced mainly through financial incentives considered to be both positive and negative. While some managers perceived the financial incentives as a driving force and a tool for change, others saw them as a stress factor due to uncertainty, competition with other primary healthcare centres and negative feelings associated with staff cutbacks. Managers perceived a shift in power towards the patient that led to improved access and service on the one hand, but on the other hand also generated more patients with unreasonable

demands. This caused prioritization conflicts between patient groups with different needs, demands and levels of empowerment. Managers expressed concern about potentially negative effects on less empowered patients, e.g. multi-morbid patients and experienced shortcomings in their own change management skills. (Paper III)

In Region Västra Götaland, the most recent primary healthcare reform led to the greatest number nationwide of newly established primary healthcare centres, all of which almost without exception were privately owned. Now, four years after this reform, the question of whether the healthcare centre's type of ownership has influenced the quality of primary healthcare services or not, can still not be answered unambiguously. In Region Västra Götaland in 2011, the 86 privately and 114 publicly owned primary care centres were geographically unequally distributed and differed in their listed populations. While privately owned primary care centres were in the majority in the metropolitan area of Gothenburg and had increasing populations characterized by higher proportions of citizens of more affluent citizens and of citizens of working age, publicly owned centres made up the majority in the less densely populated areas of the region and had decreasing, less affluent populations characterized by higher proportions of children and elderly. Patients were slightly more satisfied with the services provided at the privately owned centres. Concurrently with targeted programmes against irrational antibiotic use, all primary care centres in the region showed the greatest decrease nationwide in the use of antibiotics from 2011 to 2014, while privately owned centres initially had higher prescription rates and greater variation. All primary care centres showed an increase over time in the use of benzodiazepines, while publicly owned centres had higher prescription rates and privately owned centres had a greater increase of benzodiazepine use. Publicly owned centres had slightly higher rates for carrying out follow-ups of patients with certain chronic conditions. (Paper IV)

5 DISCUSSION

This chapter examines the methodological strengths and limitations of Paper I-IV. It compares with other studies and discusses the representativeness, generalizability and reusability of the lessons learnt.

5.1 Methodological considerations, strengths and limitations

5.1.1 Paper I

As the purpose of this study was to increase the access rate to the Primary Care Centre and to make the most efficient use of the staff by introducing a structured patient-sorting system, it was, in a methodological perspective, more accurately a quality improvement project that followed in its publication the principles of the Standards for Quality Improvement Reporting Excellence (SQUIRE), even if this was not stated explicitly [172]. These guidelines have evolved in the last 15 years in order to enable researchers to write excellent, usable articles about quality improvement in healthcare so that findings may easily be discovered and widely disseminated [173][174]. However, according to the SQUIRE website, up until now only 16 scientific healthcare journals officially accept manuscripts following SQUIRE [175]. The publication of studies following the methods of pragmatic science makes it possible to track effects over time; to use local workers' knowledge in measurement (familiar with the subject matter and work); to integrate detailed process knowledge into the work of interpretation; to use small samples and short experimental cycles to learn quickly; and to employ powerful multi-factor designs [176]. The limitation of this study to one primary care centre is therefore not necessarily a methodical limitation but reflects the different scope of the study. As mentioned in the introduction, primary care centres can be seen as complex adaptive systems that have varying internal mechanisms [98]. This makes it more relevant to understand change processes in detail at one site in order to identify the underlying factors and principles that influenced the outcomes, than to study "one-solution-fits-all" models that have previously been proved to have only marginal effects [99][177].

The development, implementation and quantitative evaluation of the structured patient-sorting system took place prior to the most recent healthcare reform, which eliminates the risk that the reform influenced the

outcomes. As the changes conducted at the sited studied were of great practical relevance for the listed patients, acute measures like the employment of two other General Practitioners were inevitable even if not favoured from a methodological perspective. This reflects the study's approach to analyse a real-life scenario compared with a laboratory type of set-up where these factors would have been eliminated. Another example of the difficulties of handling pre-existing conditions is the measurement of rational antibiotic use. Although it was possible to compare the overall level of antibiotic use with regional and national data, a meaningful direct comparison with data from the period before the implementation was not applicable since patients with minor infections were previously often referred to other clinics. The study also lacks a more detailed investigation into working conditions before the introduction of the new system. Such an investigation would partly have examined the coping mechanisms of overburdened General Practitioners witnessed by the author as they provided substandard 10-minute consultations for multi-morbid patients, also involving simultaneous language interpretation. The necessity to study the effects while concurrently continuing to provide the full range of services without compromising them, has led to methodological compromises such as the small number of variables measured and the plainness of the short questionnaires used. A measure of the effective accessibility would have included a complicated measurement of the proportion of patients to have been rejected due to lack of available appointment times. This measurement was only conducted one time-consuming, one week long documentation before the development of the new system: all patients rejected due to the unavailability of appointments were counted including the conditions they had sought for. Later the access rate was determined by measurement of the number of patient visits during a certain period of time. This variable corresponds to one aspect of productivity, but it does not reveal whether or not more actual value was created for the patients, as the shorter consultations might have led to quality loss. However, the results of the short questionnaires concerning the perception of accessibility and satisfaction with the delivery of services did not reveal quality losses but rather indicated the opposite, with improved results after the implementation of the new system. The group of professionals with the greatest number of visits, the General Practitioners, showed a lower visiting rate after the introduction. Without knowing General Practitioners had previously been overburdened, this could be interpreted as a decrease in efficiency. However, the observation primarily showed that General Practitioner had afterwards the possibility to use more time resources per visit. This applies particularly for the ordinary reception, as single minor complaints had been streamlined in the drop-in reception in which patients' visits lasted on average 10-15

minutes. Deeper understanding of the change mechanisms was however not possible with the methods and variables used in this study, which contributed to the motivation and planning of the study in Paper II. In retrospect, the author would have preferred to illustrate the results presented in Table 1 of Paper I in the form presented in the thesis in Table 9 and Figure 13. The reason is the experience that the emphasis on the total increase in access rate (27%), regularly led to misunderstanding by readers as they overestimated the effect due to overlooking the addition of two General Practitioners. At the same time the author wants to declare a calculation mistake in Table 1 of Paper I: the numbers of visits per team member are 981.77 before respectively 1,107.82 after the introduction. However, this calculation mistake does not affect the calculated increase in the access rate of 13%.

5.1.2 Paper II

Since this study is situated in the field of health service research and improvement science, with the aim of understanding in detail the staff members' conceptions of the structured patient-sorting system in detail, a qualitative approach and strategic selection of participants to include all the different professions was considered reasonable [178]. The decision to choose a phenomenographic approach was of great value as its underlying theory assumes that different individuals can perceive the same phenomenon in qualitatively different ways. This is consistent with the finding that professionals' conceptions of other professionals may be dissonant with these other professionals' constructions of themselves [127][149][150]. A phenomengraphic approach allowed the extensive material (725 minutes of interview recordings) to be grasped and provided in-depth insight by identifying a phenomenographic outcome space in which each category in the outcome space revealed something distinctive about the way of understanding the phenomenon [159]. An inclusion of more than the eleven participants would have made the analysis more complicated and not necessarily better due to the enormous quantity of material [163]. The repetition of interviews after one year and the interviews with additional team members strengthened the study and made it less vulnerable to spur-of-the-moment ideas. However, the most recent healthcare reform, which took place after the introduction of the new system might have the influenced the participants' perceptions, even if none of them mentioned it explicitly. A further strength was the composition of the research team that was gender-balanced, with all researchers having professional medical backgrounds: representing the professions of nurses, physiotherapists and general practitioners as well as a practice manager. Moreover the team consisted both of members who had worked at the site investigated and members with no

affiliations to the healthcare centre, ensuring detailed site knowledge and at the same time a distanced and detached viewpoint on the interview material during the analysis. The inclusion of employees who eventually left the team might have provided more information about the change process, but was practically difficult to implement. Also, the inclusion of patients might have contributed further perspectives but these were not focus of this analysis and would probably have suited best in another, separate study.

5.1.3 Paper III

Since the aim of this study was a health service research topic – to explore how managers at publicly owned primary healthcare centres perceived the transformation of the primary healthcare system and what impact it has had on their work – the use of a qualitative method was reasonable [178]. The application of content analysis inspired by Silverman, allowing the identification of both manifest and latent content, was of advantage in this context as it permitted the inclusion of external changes and information that can be characterized as objective as well as managers' subjective assumptions, values, and priorities [160]. This systematic approach also allowed the identification of different perceptions of similar events by different professionals [163][178]. A further strength was the composition of the research team that was gender-balanced, with all researchers having professional medical backgrounds as either nurses or General Practitioners, some also with extensive experience of leadership as healthcare managers. With two researchers working within the primary care system that has undergone transformation and two researchers at that time not actively involved in primary care the understanding of details of the healthcare reform as well as a more distant and detached perspective were guaranteed. It is important to make clear that this study is limited to the perceptions of the managers of publicly owned primary healthcare centres in the metropolitan area of Gothenburg, and does not discuss how primary care managers in Sweden or in Region Västra Götaland generally perceived the transformation of the system. Also, the perceptions of managers of privately owned centres are not included (due to their refusal to participate motivated by lack of time resources). However, this limited focus offered the opportunity to study how managers with similar preconditions conceptualized emerging competition in the health market, as this was the case in the metropolitan area of Gothenburg. A study including managers from all parts of Region Västra Götaland or even other counties might have blurred the analysis as preconditions differ significantly concerning competition as well as recruitment of medical professionals and reimbursement systems. Previous studies with data from primary care have suggested that nurse managers are

more loyal to organisational objectives and organisational control compared to managers who are doctors [179]. As this study could not identify tendencies or differences in the perceptions based on the professional background of the managers, an inclusion of other medical professionals working at primary healthcare centres would have been interesting but would have been beyond the focus of this study.

5.1.4 Paper IV

Since the aim of this study was to compare privately and publicly owned primary healthcare centres in Region Västra Götaland on a group level concerning patient perceived quality, rates of purchased prescriptions of antibiotics and benzodiazepine derivatives as well as the percentage of follow-up routines carried out for patients with the certain chronic diseases, a quantitative approach was reasonable. The particular strength of this study is the fact, that it is an analysis of a total population as it included all primary healthcare centres in the region (providing care for more than 99.7% of the population) with relatively high completeness rates for all datasets. Due to these facts, no power calculation and/or tests for statistical significance were performed, but instead mean values and standard deviations (and in some cases percentiles) of the dependent variables were calculated.

The residuals of the mixed-model for adjustment based on annual data show only small tendencies to skewness (Figure 18), which is why the research group assessed this model as being viable in this study. However, due to the fact that a model based on monthly data would have shown relevant skewness, further methodological improvements should be considered: if logarithmized, data becomes less skewed and the geometric mean (the mean of the logarithmized data of all observations) becomes an estimate of the median. However, this does not provide information about certain subgroups of interest, i.e. primary healthcare centres with high prescription rates. Therefore parts of the research team of Paper IV, including the author, are currently working on further development of a model using quantile regression. In Paper IV we addressed this problem by choosing raw data plots to illustrate the prescription rates of antibiotics, being aware that these figures do not include the adjustment for explanatory factors, needing to be supplemented with the results of the above-mentioned mixed model.

Due to the imprecision of variables, certain methodical weaknesses occur in Paper IV. Difficulties concerning the results of the national patient survey have been reported earlier, including the low patient response rates, between 51.3%-53.4%, and the influence of socioeconomic and geographic factors

which were partially addressed by adjustments in the study [180]. Higher rates of antibiotic use have been reported for the elderly and for females as well as for primary healthcare centres located on the coast during the summer due to tourists [181]. These imprecisions have only partially been addressed through adjustments. Further imprecision might have occurred as some GPs have used their primary healthcare centre's workplace code incorrectly during Out-of-hours services leading to spuriously higher rates of antibiotic use for their ordinary workplace. With rising awareness of this error among prescribers, the decrease in prescription rates at a few individual centres might be partly due to a more correct use of the workplace code rather than to an actual reduction of antibiotic use. However studies on the antibiotic use in the entire outpatient care indicate a generally decreased antibiotic use in the county [181]. A high number of short patient visits might have biased the rates of purchased prescriptions of benzodiazepine derivatives, as the number of patients' visits was counted in the denominator (and not the number of listed citizens). Datasets on patients with ischemic heart disease had lower completeness rates at privately owned primary healthcare centres, complicating the direct comparison. The incomplete datasets of some variables were in most cases due to technical difficulties during the transfer and aggregation of data from healthcare centres to the regional healthcare authorities. Due to the exclusion of Out-of-office services and single-handed practices because of non-existing or non-available datasets it was impossible to include prescription rates for the whole of primary care.

5.2 General discussion

The findings of this thesis' add knowledge to two important intertwining areas that ensure and improve the quality of primary healthcare centres: firstly to the area of health service delivery through the study of the structured patient-sorting system; and secondly to the area of governance and stewardship in primary care through the study of the transformation of the primary healthcare system after the most recent healthcare reform

Reforming health service delivery

Paper I and II showed that the introduction of the structured patient-sorting system at the Biskopsgården Primary Healthcare Centre resulted in improved accessibility and a more efficient use of competences and the development of an effective team bearing a new organizational culture of continuous improvements. Other studies investigating further aspects of the new system describe additional relevant improvements. They show that the structured patient-sorting system seems to satisfy patients' wishes and needs for quick access to a psychologist and that long-term healthcare consumption decreased

for patients initially seeing physiotherapists [182][183]. This suggests that the new system, which primarily aimed at accessibility, as a result addressed more problems that seemed to be connected. Examples were the parallel establishment of a streamlined drop-in GP reception for minor complaints with short visits, while simultaneously providing more time per visit at the ordinary GP reception that dealt with patients with comprehensive needs. Employees accepted even a shift of patient visits from General Practitioners to other medical professionals, which was part of this transformation, as they identified the common goal to provide as far as possible appropriate care for all patients.

The characteristics of that specific primary care team corresponded well to earlier research on effective teams: collaboration, conflict resolution, participation, and cohesion were most likely to influence staff satisfaction and perceived team effectiveness [184]. Also the characteristics of an effective network for improvement apply well to the team studied: common purpose, cooperative structure, critical mass, collective intelligence and community building [185]. The finding that there was only a low degree of disengagement of team members over time, indicates that the introduction of the patient-sorting system meets one of the major challenges of quality improvement: to go beyond initial stages of a project and actually attain the targeted results [122][186]. As previous research has shown, quality improvement agents need to understand the target groups and the setting; to know how new working methods and procedures are implemented; to try to see the target groups' perspective; and to involve them in both the development and implementation of the innovation [187]. Prior research on effective teams in primary care support the findings of the study and stress the importance of creating highly effective primary care teams and the transformation of primary healthcare centres into patient-centred medical homes providing comprehensive care particularly for patients with chronic conditions [188][189][190].

These findings supports the theory that primary healthcare centres can be seen as complex adaptive systems, where a change in only one, but crucial part of the system may result in changes in all other parts of the system [98][99][100][136][191][192]. In fact primary healthcare centres are much more complex than present strategies for change assume [98]. But was the new system more than a successful n-step quality improvement project? As others outside the primary care centre noticed the changes and results achieved, the project became more popular and was eventually nominated for a national quality prize in 2010. The local primary healthcare organization encouraged all primary care centres to establish similar systems. The working

manual that had been developed for structured sorting was printed and distributed. At the time when interviews for the study in Paper III were conducted, all participating centres had established a structured patient-sorting system in one way or another. As one additional question in the interviews was focused on the implementation of the structured patient-sorting system, the managers' narratives permitted insight into how these local implementations and perceptions of results varied. None of the other 24 primary healthcare centres had a system that was similar to the original model and none of the centres had invested the same amount of time in their development. Approaches differed from top-down implementations with the simple instruction to use the manual for patient-booking to advanced participative implementations with adaptations to local preconditions. Some managers even admitted that they only pretended to use a structured patient-sorting system as they had been requested to have such a system.

These varying results are reminiscent of disappointments known from Lean healthcare initiatives [121][193]. They reveal that breakthroughs were not reached through simply applying n-step models. The in-depth analysis of Paper II reveals that the transformation into a resilient, highly effective team was a pervasive event that encompassed several change processes concurrently (the improvement of healthcare delivery processes, the empowerment of professionals and team development). These processes were furthermore embedded in an appropriate framework that allowed participation, negotiation and conflict management. This finding is supported by other research emphasizing that managing organisational change and managing organisational quality go hand-in-hand and that emotional changes in an organization during these processes have be taken into account and addressed appropriately [194][195][196].

Reforming governance and stewardship

The findings of Papers III and IV correspond well to the major effects observed in the recent years, demonstrated by a number of other studies and reports: the shift of power from the caregiver towards the patient; the increased number of primary healthcare centres; the increase of visits by healthier groups in the population; and the unequal distribution of privately and publicly owned primary healthcare centres with regard to geography and socioeconomy, despite targeting incentives [17][84][197][198][199]. However, there is a controversy, as to whether or not these changes were caused by the most recent healthcare reform or if changes had already started beforehand and were instead caused by earlier reforms and other factors [17].

Regardless of the reason for these changes, it may be noted that the financial incentives in combination with tough competition had a massive impact on the participating managers. They perceived them as the major driving force, leading to rapid and powerful changes that were experienced and handled differently depending on the existing preconditions as well as on variations in their management skills. The managers raised the concern that the financial incentives and tough competition led to prioritization conflicts concerning allocation of resources affecting for accessibility for demanding patients with minor complaints and for less-empowered patients with comprehensive conditions. Further research underlines this conflict on the system level: the primary care choice reform, which is based on the values of consumerism and individual choice, was not problematized by policy makers in relation to the current healthcare legislation such as the Health and Medical Services Act [200].

According to Gersick's revolutionary change theory, the healthcare reform is equivalent to a brief period of revolutionary upheaval after a long period with a stable infrastructure and with only incremental changes [201]. The perceived conflict that arises from making the correct prioritization between financial constraints and patient demands is an indication of what Gersick describes as a change in the 'Deep Structure'. This conflict of values may affect the degree of innovation needed to meet future demands, such as e.g. aging, multi-morbidity or mental health issues, since previous research has shown that innovations often arise through internally driven initiatives and not through external financial incentives [202][203]. Therefore it is legitimate to ask if the short-term goal to increase responsiveness through rather one-dimensional command-control measures, such as financial incentives, might compromise the long-term goals and suppress important innovation. An alarming indicator for this was the fact that managers expressed low interest in own research initiatives, despite availability of research funding. This means that it is questionable whether or not an advanced quality improvement project such as the structured patient-sorting system has found the right conditions for development after the introduction of the healthcare reform.

The shift of power towards the patient can primarily be seen as an improvement, as reports stated earlier deficiencies [17][60][96]. However, if power shifts too much in one direction, it may result in an imbalance, with unwanted and costly effects that could unintentionally lead to a more ineffective primary care system. Some studies have shown more advantages for healthier and more affluent populations with a greater choice of providers and satisfactions rates above average, compromising the goal of the Swedish

National Board of Health and Welfare to prioritize the improvement of care for frail elderly [53][198][199].

The findings of Paper IV could not answer unambiguously the question whether or not the quality of primary healthcare services was influenced by the healthcare centre's type of ownership, but showed that the variation in the outcome measures was higher at privately owned centres. This means that the individual's choice between two privately owned centres was statistically seen as more decisive than the choice between two publicly owned centres.

Moreover it revealed some unexpected findings that deserve further discussion. A decrease in antibiotic prescriptions, indicating a more rational use, and an increase in the already high rates of prescription of benzodiazepine derivatives appeared simultaneously in primary healthcare centres regardless ownership type. This fact demonstrates that the reformed system, building on incentives and competition, did not lead centres to gravitate spontaneously to improved outcomes. A recent study's results indicated that the primary care choice reform in Sweden leading to increased competition had a positive and significant effect on antibiotics prescription [204]. Therefore it seems very likely that the intervention of Strama contributed substantially to the decrease of antibiotic use as this would be consistent time-wise. Interestingly this intervention was not based on financial incentives but worked mainly through involvement of GPs as mediators, peer-led discussion rounds, development of trust, provision of reliable information and transparency. This supports the theory that financial incentives are of little use in the context of innovation or improvement of medical outcomes [203]. In turn, the rising prescription rates for benzodiazepine derivatives might be either interpreted as an increasing demand in the population (e.g. due to an increasing proportion of patients referred from psychiatry back to primary care) or as a result of existing competition and a lack of GPs' insight into negative consequences [205].

As mentioned above, effects of the recent healthcare reform have been studied concerning some quantitative and qualitative measures concerning accessibility, inequity, costs and perceived quality, but information about effects on medical outcomes are hardly available. The parallel existence of privately and publicly owned providers make third party inspections necessary to control whether or not healthcare organisations are fulfilling mandatory standards improve care processes and professional practice. However, a Cochrane Review came to the conclusion that too few studies were in existence to draw any firm conclusions about the effectiveness of external review of compliance with standards in improving healthcare

organisation behaviour, healthcare professional behaviour or patient outcomes [206]. A further Cochrane Review showed that there is some evidence to suggest that the way in which primary care physicians are paid may affect their clinical behaviour. It concluded that there was some evidence that primary care physicians provide a greater quantity of primary care services under fee for service payment compared with capitation and salary, although long-term effects are unclear. There was no evidence, however, concerning other important outcomes such as patient health status, or comparing the relative impact of salary versus capitation payment [207].

This indicates a demand for improved systems of governance and stewardship that go beyond believing in simple market mechanisms with administrations that prefer to act in a command-control manner instead of leading and developing towards a sustainable system with improved quality. Instead of the recurring public discussion which reduces the problem to the too simplistic question of whether privatization is beneficial to the health system or not, new strategies should both include all stakeholders in collaborative models of policy dialogue and encourage research and innovation that meets the upcoming challenges [6].

As primary healthcare centres and the health system itself are highly complex, effects of changes in the systems are difficult to predict, especially when the information needed for policy-making is scarce [87][136]. In order to react swiftly to unbalanced trends, regular consultation with all partners – governmental representatives, healthcare professions, the scientific community, the private sector and civil social organizations – are necessary to reach a negotiated consensus as to how resources should be allocated and which value should be created. This is compliant with the experiences that the legitimacy of policy choices depends primarily on procedural fairness and transparency [6][137][138]. As these systems foster dialogue, they also constitute an ideal platform to encourage and disseminate local innovations for the best practices and optimized health service delivery.

Bearing in mind, that primary care is not cheap but provides better value for money than its alternatives, health systems should recognize its importance and the vulnerability of the whole healthcare system which accompanies with the progressively worsening recruitment situation for General Practitioners in many industrial countries [19][20]. Initiatives like the patient-sorting system provide only short-term answers to relieve overburdened GPs by transferring patients to other professionals in effective primary care teams in order to break vicious circles and to improve the attractiveness of being a GP. Examples show how resource allocation can move from budgetary systems to

holistic approaches that integrate primary and secondary care in a more efficient way – a scenario for which Sweden has excellent preconditions – such as total financing systems like California based Kaiser Permanente, that can control costs over sector boundaries throughout the whole system, or multilevel approaches like the Bidasoa integrated delivery organisation in the Basque Country working with incentives [208][209].

5.3 Representativeness, generalizability and reusability

Improvement science, health services research and implementation science have emerged in the last decades to complement traditional scientific research. All of these fields are similar in their focus on translating what is learned from traditional scientific research into actual practice to improve care and outcomes. They encompass theory, research, policy and practice as well as behaviour change and act similarly to the way that engineering science uses scientific knowledge and theories to address real-life problems [210]. A number of different approaches have been suggested to gain knowledge incrementally gain in the science of change in healthcare. Among these are observational studies of existing change processes; in-depth qualitative studies on critical success factors for and barriers to change processes; systematic sampling and interpretation of experiences of change; and methods for evaluation of large-scale implementation programmes [211]. This thesis contains both observational studies and in-depth qualitative studies.

Papers I and II focused in depth on one single primary healthcare centre and provide valuable information about the effects and underlying factors of a successful transformation of a primary care team. As mentioned above, this change was noticed from outside the centre and led to dissemination of the idea. The new system had also been presented at national conferences and a number of primary care centres from all parts of the country visited the Biskopsgården Centre to gain inspiration. The system has been adopted by a number of primary care centres in Sweden and was eventually nominated for a national quality prize. So even if the scope of these studies was limited to one healthcare centre its findings were transferred to and re-used in other implementations, which corresponds well to prior research that has shown that experiences from similar change initiatives proved to be a helpful success factor in new implementations [212]. This, however, is not equal to generalizability, but shows the reusability of the knowledge. More insights

and generalizable knowledge will be gained, when a number of implementations are studied.

Through Paper III in-depth insights into the perceptions of managers were gained which helped to understand the strengths and shortcomings of the reform. Since information and knowledge is scarce on how medical outcomes are influenced by the way primary healthcare is governed and delivered, further observational studies are necessary that can amend the insights gained through Paper IV. Limitations of some existing indicators became clear and this knowledge can be used in the further development of these indicators. These insights suggest the need to continue investigating more outcome measures and continuously to observe emerging trends in outcomes. However, expectations should be realistic, since prior research discussed the complexity of this issue and difficulties with measurement of quality in primary care [213]. The findings of Paper IV also indicate demands to further investigate how interventions can influence prescription patterns.

6 CONCLUSIONS

The introduction of the patient-sorting system led to a substantial improvement in the accessibility of the Primary Healthcare Centre. Many patients, who contacted the Primary Healthcare Centre and who prior would have appointed a GP, were after the implementation of the new system sorted to other medical professionals and satisfactorily treated by them without any reports of medical backlashes. These findings indicate a more efficient use of the personnel. Furthermore, the staff members' and the patients' perceptions indicated an improvement in possibilities to book patient appointments after the introduction of the structured patient-sorting system.

During the development and implementation of the new system several important change processes took place concurrently: the improvement of healthcare delivery processes, the empowerment of professionals and team development. This therefore indicates the importance of an appropriate, contextualized framework to support multiple concomitant quality improvement processes. Knowledge from this study can be used to assist and improve future implementations in primary healthcare centres.

The transformation of the primary care system was perceived as rapid change mainly enforced through financial incentives and leading to prioritization conflicts between patient groups with different needs, demands and levels of empowerment. It suggests a need for an improved governance system to ensure development towards a more effective and sustainable primary healthcare system.

The question whether or not the quality of primary healthcare services is influenced by the healthcare centre's type of ownership cannot be answered unambiguously. However, the variation in the outcome measures was higher at privately owned centres. A decrease in antibiotic prescriptions and an increase in the already high rates of prescriptions of benzodiazepine derivatives appeared simultaneously on average at all centres regardless of ownership type, indicating that centres do not gravitate spontaneously to improved outcomes in the existing system.

7 FUTURE PERSPECTIVES

The research about the effects of health service delivery reforms and governance reforms on the quality of primary care is still in the early stages. Since knowledge in this field is created incrementally a larger number of different studies are needed including observational studies and in-depth interviews with stakeholders. Also, the instruments and methods for measurement need to be further developed. One potential approach is the development of a national primary care registry.

Sweden is an international pioneer in Quality Registries in healthcare and has long-established registries like the National Diabetes Register that contributed essentially to medical knowledge and the quality of delivery of diabetes care [168][214][215]. However, despite diabetes care, information on primary care is scarce and in 2012 the Swedish government initiated projects to develop an instrument for quality improvement based on automated data collection from electronic medical records [216]. This initiative aims to deliver reliable information on the performance and quality of primary care centres nationwide. The system could also be used for systematic feedback to medical staff, the follow-up of health service delivery via healthcare authorities, the exchange of data with disease-specific registers and primary care-oriented medical research. It requires a highly complex interweaving of technological, organizational and legal aspects. A feasibility study showed that a large proportion of data from electronic medical record systems could be extracted and technically used for the purposes named above. However, in order to exploit the full potential, a greater degree of data-structuring at source would be necessary, which means that users of medical record systems needed to adapt their documentation behaviour. This culture change is as relevant as the technical challenges and should be approached with care and in close collaboration with the healthcare professions to avoid negative consequences for healthcare processes and the individual consultation. This initiative has the potential to bring the system a step toward documentation supporting the relevant healthcare processes, and care providers gaining new perspectives on their patient populations [216].

In order to implement health service delivery reforms that organize health services around people's needs and expectations, policy-makers need to work closely with health service researchers and improvement scientists. Business as usual in healthcare systems is not a viable option. The emerging challenges for healthcare systems can only be met, when all stakeholders - governmental representatives, healthcare professionals, the scientific community, the

private sector and civil social organizations - work together in collaborative models for policy dialogue.

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